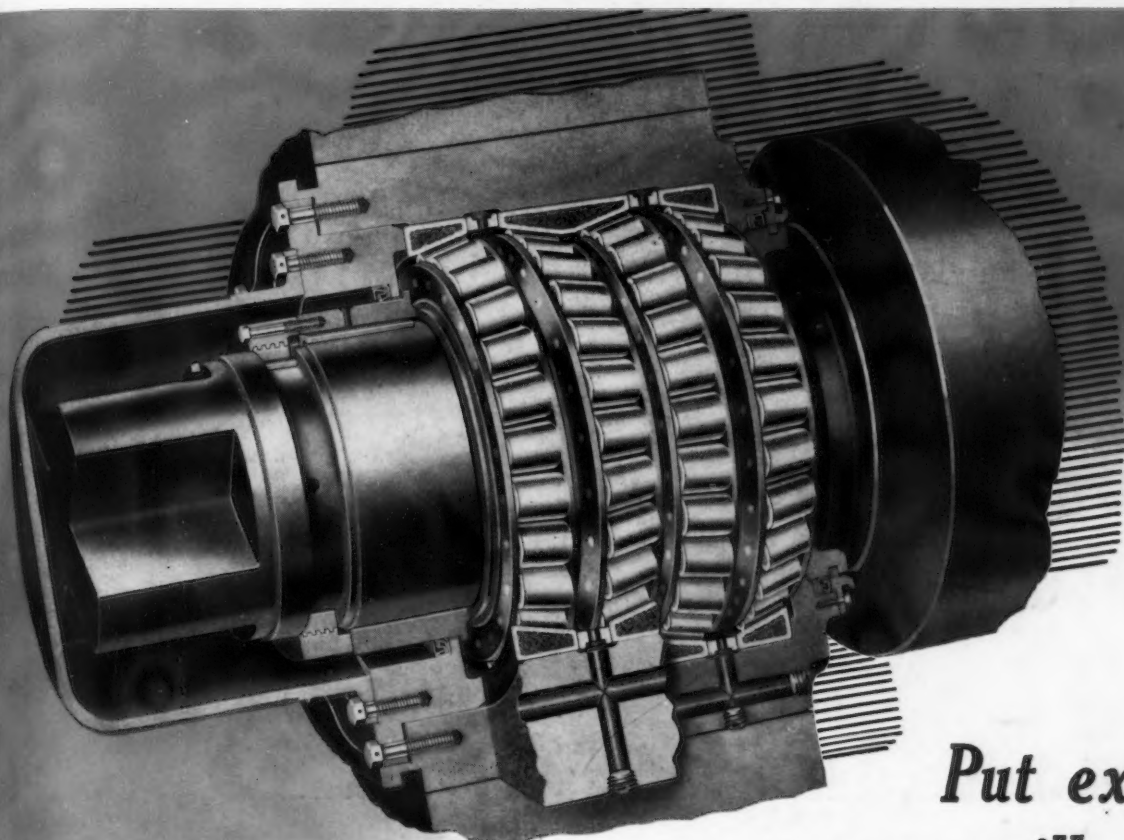


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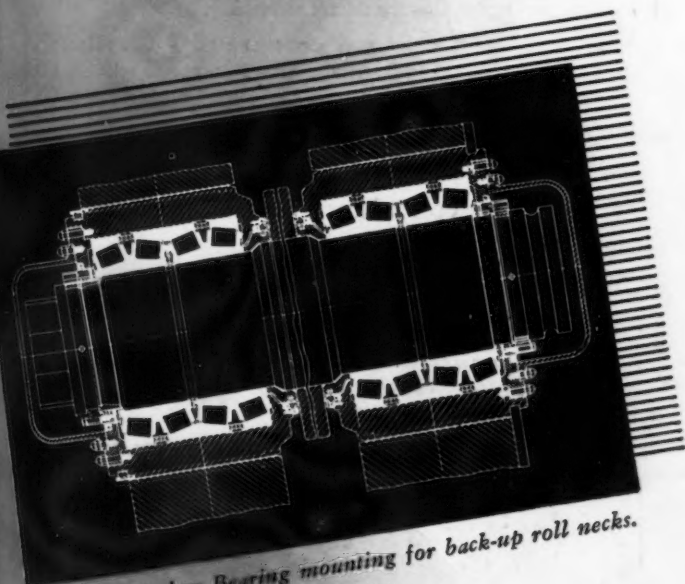


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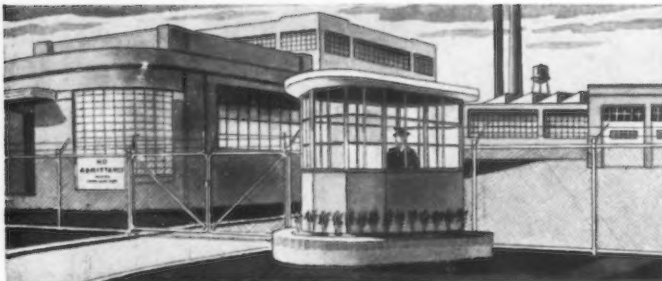
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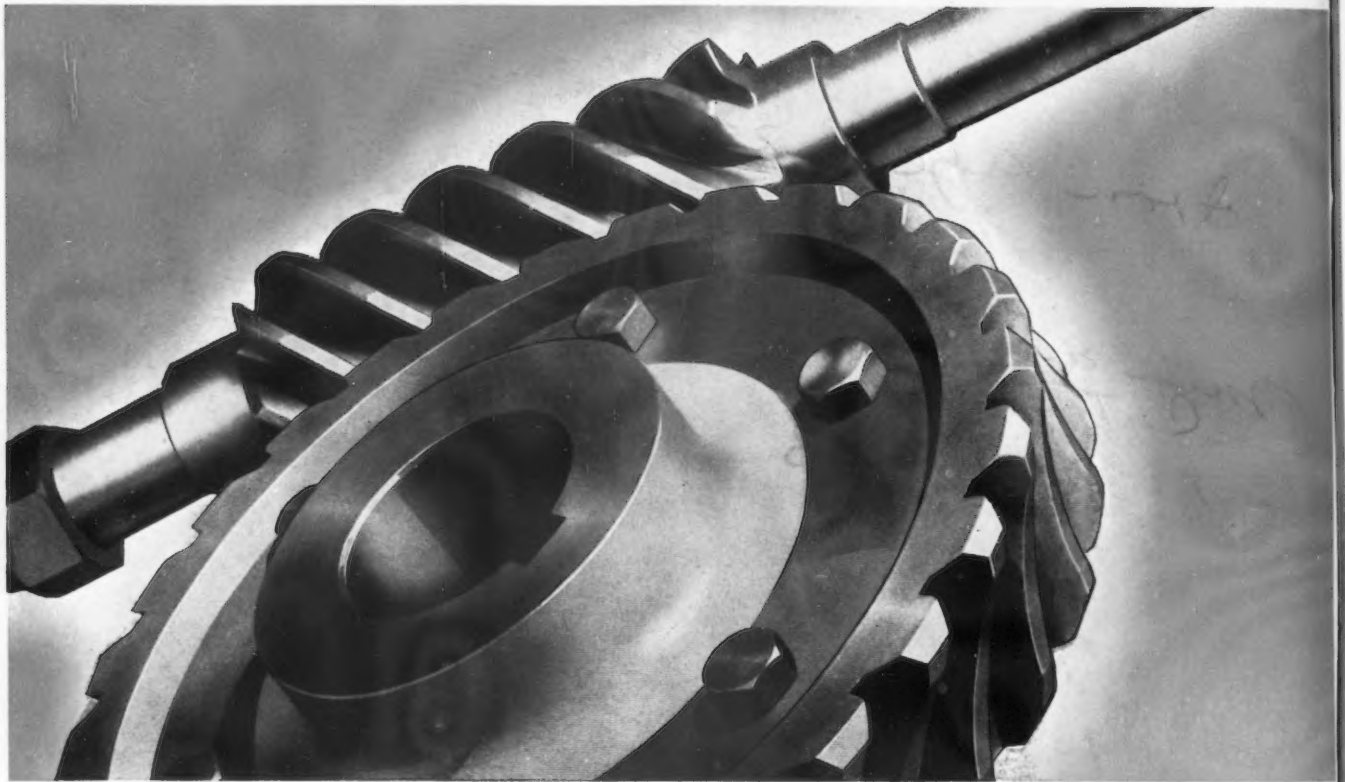
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CONCERNING WARTIME VACATIONS

The terrific pace of war production continues—and with metals still on the critical list—men who buy are under greatest pressure. But brief periods of mental relaxation are still essential to health and efficiency. So, in the interest of your country, your company, your family and yourself—you should take some time off this summer.

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and God bless them. But a happy vacation really doesn't depend on distance—so plan ahead—leave your worries behind and soak up some good old sunshine.

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A Business Man Writes About Business

“WHEN a man bites a dog, that’s news.” When a business man writes a book about business, that’s news too in these days when most books about business are written by people who have never had first hand experience in it.

Personally, I have always preferred to read books, fiction excluded of course, that were written by authors who had first hand information concerning their subjects. Perhaps that is the prejudice due to an engineering education. But I would suppose too that a medical student would prefer to get his anatomy from a doctor rather than from a poet or pawnbroker.

Many, many books, most of them condemnatory or at least critical have been written about business during the past few years by economists, lawyers, politicians and professors, none of whom have had even a smattering of experience in the subject on which they write. This has a distinct advantage from the author’s standpoint and perhaps from the readers’ too, since unfettered imagination can bring the fascination of fiction to a subject where a limitation to facts might make more prosaic reading.

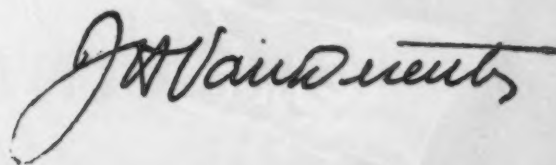
It is refreshing, therefore, to find a book written about business by a man who is thoroughly familiar with it and yet who tells the story of its function in a democratic society in an extremely interesting way. I refer to “The Spirit of Enterprise” just from the press of Charles Scribner’s Sons, written by Edgar M. Queeny.

Mr. Queeny is well known to many of our readers as the president of the Monsanto Chemical Co. of St. Louis, and one of America’s outstanding industrialists. His book should be in the hands of every business man who believes in the dignity and usefulness of his occupation and also in the vastly greater number of hands of those who have been misled into believing that private enterprise is an incorrigible public offender.

“The Spirit of Enterprise” is not a one sided book. It is not written as a defense of capitalism nor as an attempt to whitewash those errors that have grown into it through the distortion of its principles by selfish interests. It is an exposition, on the contrary, and a very convincing one, of what American capitalism has done for our American people and what greater things it can do in the after-war future if we imbue it with the true spirit of enterprise.

One who has read the “anti” works of Marx, or of Thorstein Veblen and Stuart Chase, whose grasp of practicalities is indicated by their sponsorship of the pseudo “Doctor” Scott and Technocracy will find it refreshing to hear from a man whose writing and reasoning are based on fact instead of speculation.

Mr. Queeny does not share the belief of some that it is necessary to abandon the social aims of the New Deal. Nor does he think that industrial management as a whole does either. He does believe however that these objectives are unattainable through regimentation and the extension of bureaucratic control of enterprise and that the one hope of attaining them, together with a better standard of living for all is through unshackling the spirit of enterprise and encouraging honest competition.



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● Steel industry average work-week in May, 1942, was 40 hr.; total employees were 548,000. The work-week climbed slowly to a 44.1-hr. level in May, 1943, and total employment dropped to 522,400, with average of weekly earnings \$49.12.

● Steel production lifted sharply in the May 1942-May 1943 interval, and the 26,600 drop in employees was the result not only of a longer work week but also of shift from production of highly finished steel.

● In June the steel industry lost about 279,000 tons of ingots, compared with May output—131,000 tons because of the coal strike, about 148,000 tons because of repairs and breakdowns, particularly severe during June.

● WPB shortly will issue a directive further restricting the use of columbium-stabilized (Type 347) stainless steel, forcing more borderline tonnage to the titanium-stabilized alloys.

● Electrolytic tin plate now accounts for 13½ per cent of total tin plate output, having doubled percentage-wise and tripled tonnage-wise since January.

● And: Mills are striving to lift efficiency of electrolytic tin plate lines from a current 70 per cent average to somewhere around 95 per cent. Further improvement in strip cleaning is expected to reduce the excessively high percentage of waste plate.

● While WPB and Government officials rant against civilian complacency about the war and industry's post-war shenanigans, the average sentiment around WPB itself is just about identical with what is being condemned.

● The stainless steel frozen inventory total has dropped from 18,000 tons down to about 12,000 tons, of which about 1000 tons is thin, narrow, 17 per cent chromium auto trim strip, the remainder being pretty much cats-and-dogs. Steel Recovery Corp. is now far less inclined to guard this stock of stainless for its alloy content, in view of the current incomplete utilization of stainless scrap coming into the market.

● Therefore: Rules will be eased for utilization of this stainless stock, particularly in aircraft and even for some uses questionably essential to the war effort. The 12,000 tons will likely be cleaned up in 6 months.

● An industrial quarantine to provide additional manpower for Boeing Aircraft is being slapped on the Seattle-Tacoma area. Six small manufacturers and boat builders have had Army contracts cancelled and others have been warned to move from the area or the axe will fall. Boeing's wages are stabilized below the area's average.

● Personnel problems at Alcoa's Cleveland plants have been completely delegated to the union (CIO Mine Mill and Smelter Workers), following 18 months of high turnover and absenteeism.

● In spite of fancy regulations, ferrous turnings are still in a sorry state, with producers frequently finding no market and no way to comply with WPB orders that turnings move. Proposals that steel mills install crushing and briquetting equipment are meeting stiff opposition.

● A German analyst writing recently in *Stahl und Eisen* said American steel capacity and production were given a bogus lift by shifting reports from a gross ton to a net ton basis. He said the move was dictated by a desire for more impressive propaganda figures.

● Powder metallurgy now offers a large field for electro-plating: the manufacture of copper and powders by electrolysis and possibly plating of metal powder parts to cover the porous structure.

● Jobbers handle about 12 per cent of the steel tonnage, but west of the Rocky Mountains the jobber tonnage jumps to 30 per cent of the total, and over 50 per cent of the wire products and tubular tonnage in that area is handled through jobbers and distributors.

● When 45 foremen at the Ecorse plant of Murray Corp. of America recently went on strike, workers continued production uninterruptedly, without supervision.

● Renegotiation of air raid damage payments has become German practice. With factory inspectors falling behind in their estimating, companies applying for damage are receiving advance payments subject to adjustment.

● New designs for infra-red reflector equipment and new application techniques will make possible temperature ranges in excess of 1000 deg. F.

Plastics and Plasticity

By E. V. CRANE

Chief Development Engineer, E. W. Bliss
Co., Brooklyn

COMMERCIALLY, *plasticity* refers to the ability of certain materials to be pulled or pushed into useful shapes. Many metals, iron, copper, aluminum, nickel, silver and many of their alloys are plastic in their frozen or crystalline state. These and other metals, glass, silicones, natural and synthetic resins, etc., are plastic (forgeable, formable) in their heated or semi-fluid state. Other materials are plastic or shapeable when moistened with a suitable solvent as putty, plasticine and paper (moistened with water). The materials having characteristics of plasticity in these three plastic states are described, in order, as *crystoplastic*, *thermoplastic* and *soluplastic*.

Thermosetting and *solusetting* materials should also be distinguished here as they interlock closely in many respects with plastic materials but for practical purposes they lack plasticity. In general these are mixtures of fillers, flow aids and setting adhesives, powdered for mobility. In the presence of heat or a solvent they undergo a chemical reaction or change which solidifies or sets the binding adhesive. By reason of the chemical change they cannot be made plastic for further change of shape.

Typical of thermosetting materials are the common phenolic (carbolic acid and formaldehyde) resin binders

mixed with a lubricating plasticizer and such fillers as wood, flour or asbestos for compression molding in heated dies; or mixed with alcohol and other solvents and impregnated into paper, cloth or plywood, then baked flat or to shape under similar heat and pressure. The sulphur reaction in rubber molding and the copper-tin reaction in the sintering (baking) of the molded powdered bronzes also qualify such processes as thermosetting.

Portland cement as the binder with sand as filler and water as the solvent may typify the solusetting process. "Cold molded" electrical parts, tiles, paints, etc. are widely different examples of solusetting materials. Subsequent surface fusion of glazing of pressure formed ceramic clays is a separate finishing operation. We should also distinguish the term "*coldset*" materials as this description is sometimes applied to thermoplastic materials because after addition of heat to make them plastic they must cool to resolidify.

Perhaps cohesion and adhesion are useful to help distinguish the plastics and the setting mixtures. In thermosetting and solusetting methods the added bonding agent or adhesive creates a surface attachment by means of chemical combination. Among the plastics, on the other hand, mutual cohesion of molecules

(mon-atomic or complex) permits rearrangement and reestablishment of "electro-magnetic" bonds in the plastic range.

Solubility

Common salt, which might be described as soluplastic, will go into solution in water up to a certain percentage. Its molecules tend to disperse comfortably among the water molecules until they become crowded, when they crystallize out of a supersaturated solution, or until the water evaporates and they again cohere amongst themselves quite tenaciously. Gold and silver dissolve in each other when molten in any percentage, but it is of interest that the intermediate alloys (when cold) are less plastic than either of the pure metals.¹ Iron carbide dissolves in iron up to 0.83 per cent. Substantially pure iron (deep drawing steel) is found to be plastic in cold working operations up to about 65 per cent reduction. Iron carbide dissolved in iron (dispersed through it as pearlite) strengthens the steel by interference with slip plane movement² in the cold or *crystoplastic* range. Another interesting quirk of solubility is illustrated by copper and zinc.³ Alpha brass having up to

¹ Plastic Working of Metals, by E. V. Crane, John Wiley & Sons, Inc., Fig. 12, p. 15, second edition.

² Ditto, Fig. 117, p. 122 and Fig. 122, p. 127.

³ Ditto, Fig. 13, p. 15.

36 per cent of zinc dissolved in copper has considerable cold plasticity. Beta brass, on the other hand, with about 40 to 50 per cent of zinc dissolved in copper, is suitable only to hot forging (*thermoplastic*). Further increasing the zinc percentage results in a chemical compound Cu_2Zn_3

• • • The material in this and succeeding articles will eventually appear in the book "Plastic Working of Metals and Non-Metallic Materials," to be published by John Wiley & Sons, Inc., New York. This will be the third edition of the standard reference work, "Plastic Working of Metals and Power Press Operations," by E. V. Crane.

which is too brittle for plastic working, either hot or cold.

Temperature and Plasticity

Many elements, compounds of elements and mixtures (all of which must be distinguished) change as their temperature rises through more or less familiar states from solid, through "plastic", to liquid, to vapor and gas. Water, varying from solid ice to liquid to steam, is familiar, but its moldability in the slushy stage is debatable, unless we consider snowballs and ice cream. Among the common "thermoplastic" hydrocarbons, the lowly paraffine candle will mold itself into some sad and droopy shapes on a hot day. However, on a cold day the candle is not plastic and will break. Typical of some synthetic molding mixtures, asbestos fibers or finely divided wood with pulverized thermosetting resins for binders and talc or oily lubricants as plasticizers, are mobile rather than plastic up to the time that setting heat is applied. The mixed mass is hot plastic only during the extremely brief setting period. The speed of this reaction has delayed and complicated the application of thermosetting materials to injection molding.

Two periods of plasticity are noteworthy in some materials. Thus, commercially pure iron (deep drawing steel), aluminum, copper, nickel, lead and some of their alloys are of a sufficiently simple crystal pattern or arrangement so that they may be cold worked in the crystalline state below their annealing or recrystallization temperatures. Secondly, they may be hot worked in the amorphous state of increasing atomic distances and shifting interatomic bonds between the crystalline and fluid states. The limiting temperatures of this thermoplastic range may be relatively wide, as for beta brass or relatively narrow, as for copper. Lead is normally worked in its hot range as it anneals at normal room temperatures. Note also that zinc, tin and magnesium are thermoplastic only for practical purposes, as their crystal structures are too complex for appreciable slip plane movement. However, tin anneals below room temperature and zinc and magnesium require comparatively little added heat to give their atoms sufficient mobility for plastic change of shape.

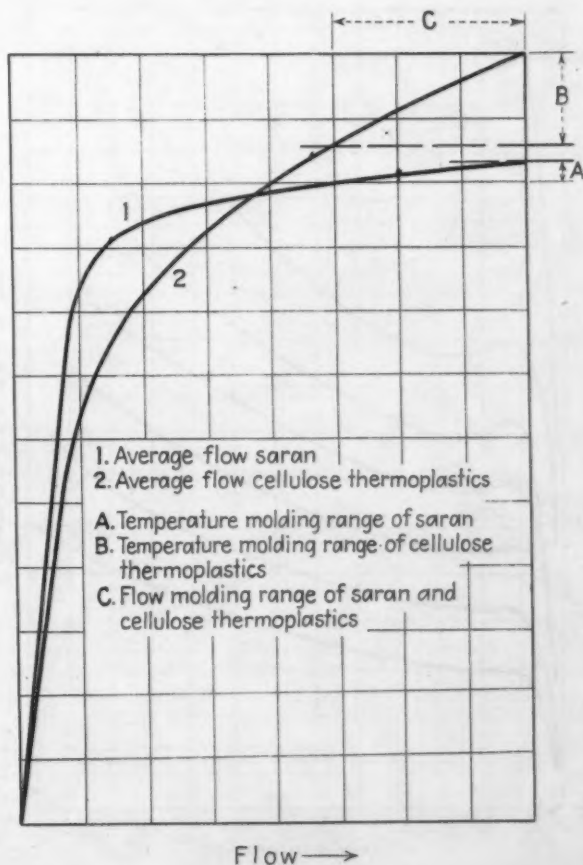
Among the synthetic resins, cellulose acetates and methyl methacrylates are both thermoplastic and the latter appear to have an appreciably wider hot working range which gives the operators more handling time.

• • • Recognition of the several states of plasticity makes it possible to show that the press working methods of mass production follow rather simple rules throughout the expanding range of engineering materials, whether they be metallic, organic or ceramic. Materials are workable and reworkable in the crystoplastic, soluplastic or thermoplastic states. Other combinations enjoy brief mobility in process through thermosetting or solusetting change. In interpreting the workability of plastics in terms of the plastic working of metals, Mr. Crane begins this series of articles by showing how the material and its state governs the combination of working pressure, temperature and time allowance required to produce a particular shape. In the second article, he will discuss the basic chemistry of various plastics.

Fig 1 shows relative temperature-plasticity relationships for two types of thermoplastics.⁴ Below the hot plastic range the methyl methacrylates become brittle, Fig. 2, but the cellulose acetates, Fig. 3, show a combination of elasticity and limited plasticity down below room temperatures. At room temperature, the elastic spring-back of the latter is so high as to offset most cold forming. Thus, within the elastic limit of the surface material, Lumarith (a cellulose acetate) may be bent to a radius of about 70 times the sheet thickness, whereas a deep drawing steel would be limited to a radius of about 1100 times its thickness or 1/15th the spring-back.

Elasticity and Plasticity have considerable inter-relation in both the cold plastic and the thermoplastic range, with consequent interesting effect upon plastic working operations. The elastic limits of bronze, copper and steel, for example, are increased as the metals are cold worked and strain hardened.⁵ At the same time, the remaining plastic range of these materials becomes progressively less until annealing and recrystallization becomes necessary. The elastic movement is represented in a stress-strain diagram by the nearly vertical increase of load without appreciable yielding of the material. The subsequent substantial compression or stretch of the material with

FIG. 1—Plastic flow vs temperature, showing that some thermoplastic materials may be worked through a wider and less sensitive temperature range than others, though possibly at a sacrifice of some other properties. Courtesy The Dow Chemical Co.



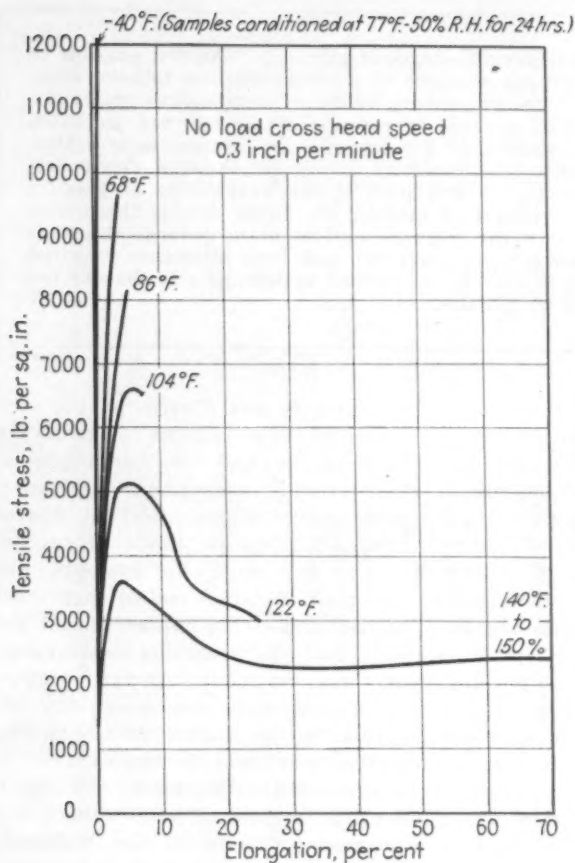


FIG. 2—While breaking without distortion and with increasing elastic limit below 100 deg. F., Lucite shows considerable plastic range with some remaining elastic recovery when warmed up to 140 deg. F. duPont recommends 248 to 280 deg. for simple forming, 300 deg. for multi-curve forming, 305 to 350 deg. for compression molding and 370 to 475 deg. for injection molding. Courtesy Plastics Dept., E. I. du Pont de Nemours & Co.

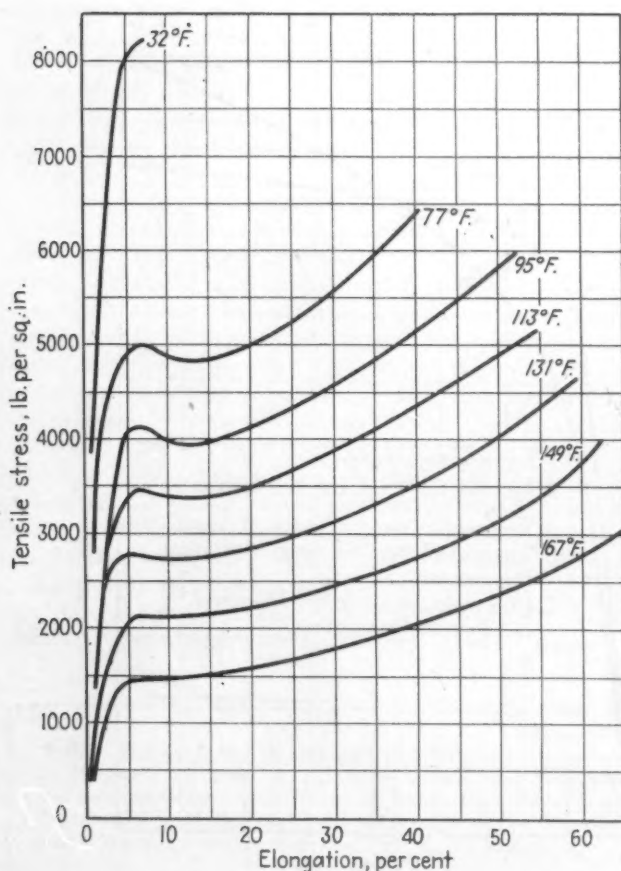


FIG. 3—Approaching crystalline brittleness with high elastic limit at 320 deg. F. Lumarith (cellulose acetate) indicates increasing plastic range and decreasing elastic recovery as temperature rises. For such material working temperatures recommended are: Forming, 275 to 280 deg. F.; compression molding, 260 to 390 deg. and injection molding 340 to 450 deg. Courtesy Celanese Celluloid Corp.

moderate change of applied force represents plastic movement. Now to return to the thermoplastic range, Figs. 2 and 3 show similar stress-strain curves for synthetic resins at different temperatures as for metals. The sudden termination in the elastic curves at the lower temperatures shows clearly their lack of plasticity in the crystalline state and the differences in their freezing points. Fig. 3 shows the lowering elasticity and increasing amount of plasticity as the temperature increases, although the curves have not been carried down to the producer's recommended forming temperatures or to the semi-fluid injection molding or die casting temperature. The dip in the cooler curves indicates a change of directional strain

⁴ For steels see Table XXI, p. 262, Plastic Working of Metals—Crane.
⁵ See Figs. 15, 123 and 185, ditto.

in the crystal structure. The subsequent rise shows work hardening, and would be eliminated by slower movement in tensile pulling or sufficient time for stress relief.

The Lumarith curves (Fig. 3) also indicate why the higher temperatures (275 to 280 deg. F.) are recommended for forming. Obviously work hardening and resistance will be less and capacity for flow or rearrangement will be greater. Also, with a lower elastic range a lesser holding or stress relieving period will be required while molecules ease themselves into a set in the new positions. To be sure, similar spring-back tendencies are found among the metals, but due to lower elasticity thereof they are neglected, or allowed for, or corrected. Thus in V-die bending operations a squeeze at bottom stroke sets up a compressive stress to counteract a remaining tensile strain in the surface fibers.

Structure and Plasticity

Modulus of elasticity being somewhat misnamed sometimes misleads us. It is rather a modulus or measure of rigidity. The modulus of elasticity for the metals is up in the millions; for synthetic plastics, many times more elastic than steel, it is down in the hundred thousands; and for the rubbers, stress-strain curves indicate it is way down in the hundreds. Even when the modulus is constant as for the steels, the maximum stretch or elastic deflection (elastic limit ÷ modulus of elasticity) may vary widely as between an annealed iron and a dispersion hardened tool steel.⁶ Here again deflections are materially greater, through widely variant, among the synthetic plastics,

and greatest among the related elastomers.

Pure metals and solid solution alloys, such as alpha brass, are monatomic, one atom per molecule. Compounds combine several atoms per molecule. Thus, iron carbide Fe_3C combines three iron atoms and one carbon atom into a molecule. Cellulose triacetate $C_6H_7O_2(COO CH_3)_3$ combines 12 carbon atoms, 16 hydrogen atoms and 8 oxygen atoms into a complex molecule having a molecular weight nearly six times that of iron yet so large and spaced so far apart that a given volume weighs less than one-sixth of the same volume of iron. Freezing into crystalline form, the intermolecular forces tend to establish an orderly and balanced arrangement.⁷ This orderly arrangement may be disturbed and unbalanced to the extent permitted by the (crysto) plastic range of the material. Internal stresses may then be relieved and orderly crystal structure restored,⁸ by annealing or adding heat so that electronic energy or activity increases to such a point as to rotate the molecule again into proper relation with those around it. The orderly internal structure of an annealed metal makes it more dense than in a disturbed, cold-worked metal. Similarly Fig. 4 shows that recrystallization of a worked thermoplastic resin (vinylidene chloride) also increases its density. Recrystallization tempera-

FIG. 4—Increasing specific gravity of vinylidene chloride during recrystallization from the mixed arrangement of the worked thermoplastic state (1.66) to the close and orderly packing of the crystalline state (1.692), improving further with time for crystal grain growth. Courtesy W. C. Goggin and R. D. Lowry, The Dow Chemical Co.

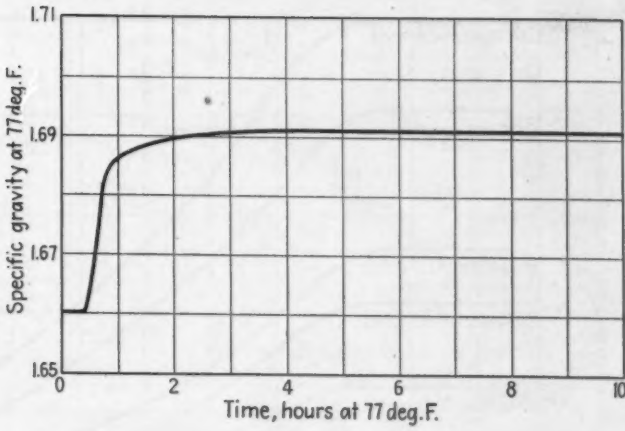
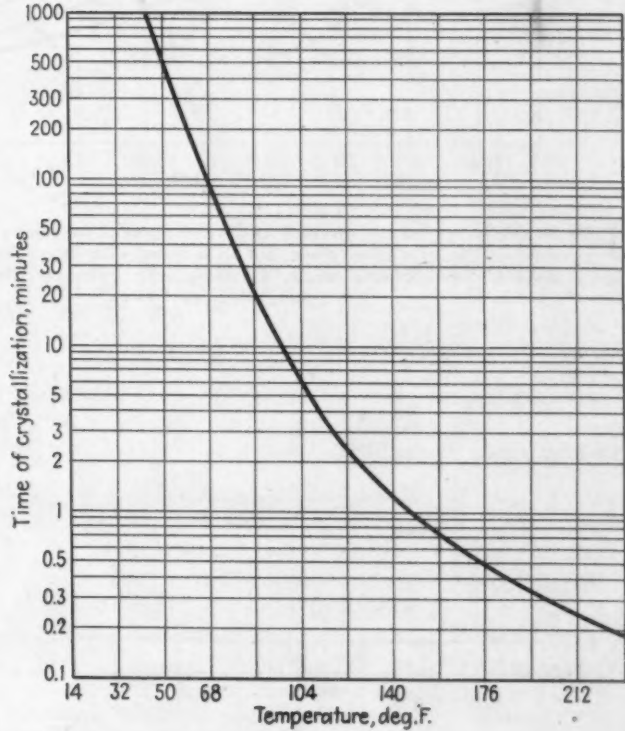


FIG. 5—Time required at different temperatures to cause recrystallization of inter-molecular stress readjustment of vinylidene chloride (Saran). This recrystallization range is typical also of the metals. Courtesy W. C. Goggin and R. D. Lowry, Dow Chemical Co.

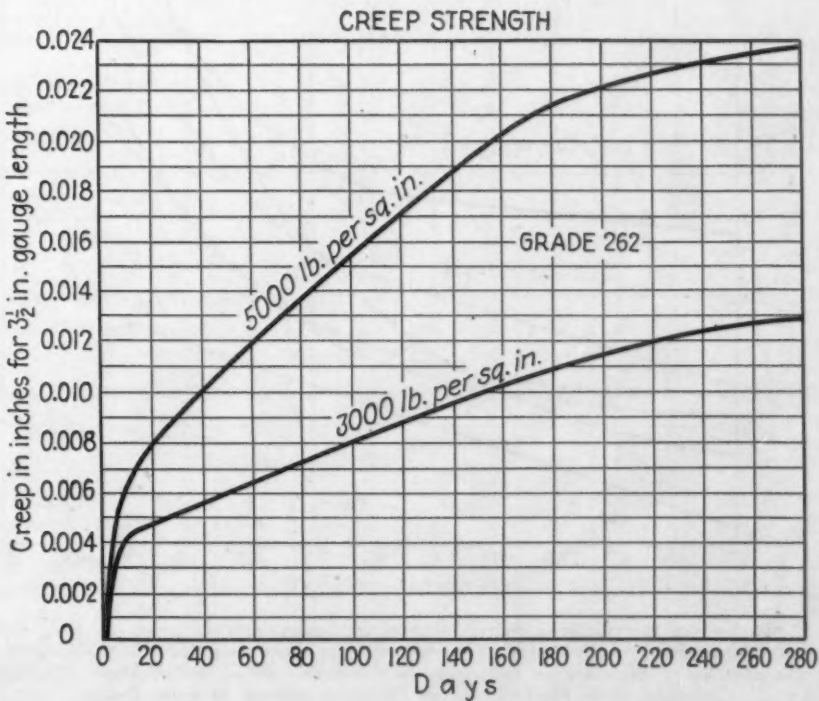


⁶ See Fig. 14, Plastic Working of Metals.
⁷ See Fig. 117, p. 122, ditto.
⁸ See Fig. 127, p. 135 and Fig. 180, p. 198, ditto.

ture is affected to some extent by the time allowed (Fig. 5) and section thickness. As the temperature is raised above the recrystallization range and into the forging or hot-working range, annealing soon becomes practically spontaneous so that only mechanical considerations (ease and freedom of movement) limit the extent of working. Atomic activity has then reached a point permitting molecular masses to be moved about quite freely although not yet so fluid (molten) as to flow by gravity. This freedom from molecular regimentation in the thermoplastic range has also been referred to as the amorphous state.

o o o
 RIGHT

FIG. 6—Improvement in density as Molybdenum powder is cold pressed at 60,000 p.s.i. then "sintered" above its recrystallization temperature to permit improvement of interatomic relations and finally plastically worked by swaging and wire drawing with intermediate annealing to correct interatomic strains. Courtesy C. G. Goetzl, Amer. Electro Metal Corp. and Amer. Soc. for Metals.



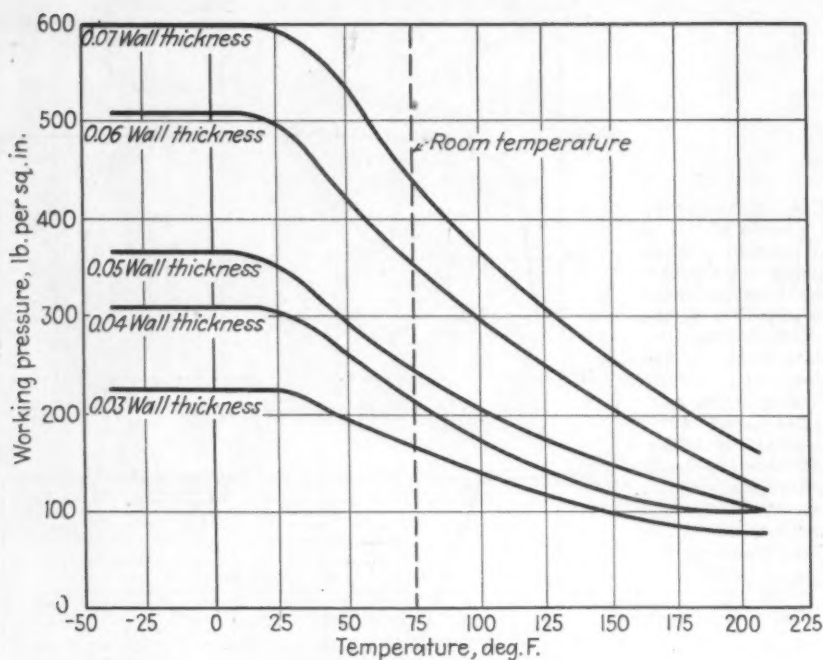


FIG. 7—As in the metals, strength of vinylidene chloride tubing remains substantially constant in the crystalline state, but is reduced with increasing temperature in the amorphous or thermoplastic range. Courtesy John Delmonte, Plastics Industries Tech. Inst., Machine Design.

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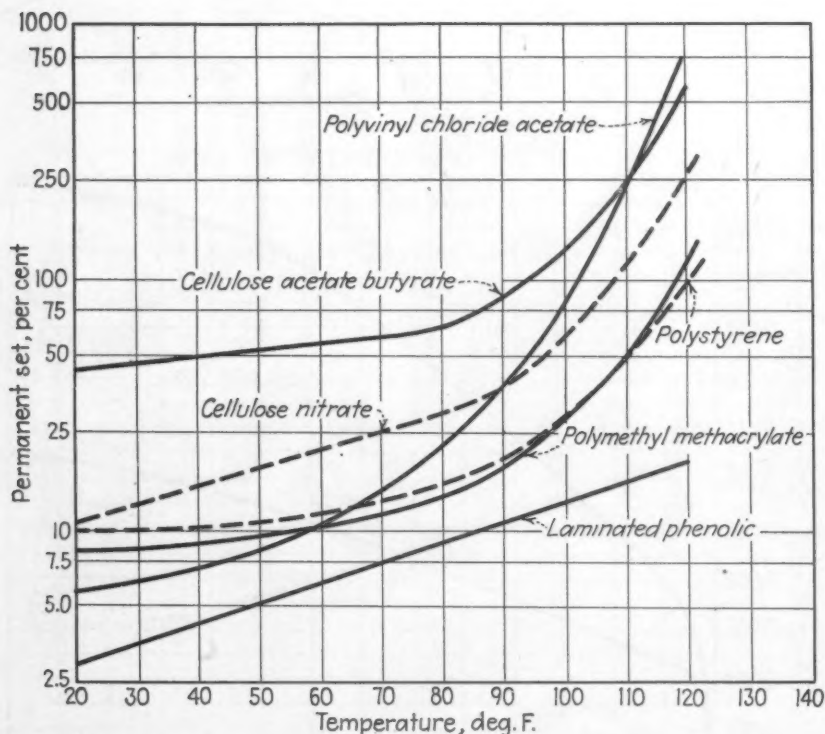


FIG. 8—Five thermoplastic materials show increasing rate of creep as they pass recrystallization temperatures. The rate remains more constant for thermosetting phenolics up to deterioration temperatures. Load and time were constant. Courtesy John Delmonte, Plastic Industries Technical Institute, Machine Design.

Pressure-welding of powders of thermoplastic materials, both metallic and organic, takes advantage of intermolecular attraction for bonding purposes. Distinction should be noted between such pressure-welding of similar fragments and the bonding of powder mixtures in which some powders are bound together by other constituents introduced as adhesives or binders.

Pressure Welding Characteristics

The four essentials of pressure-welding are (1) intimate contact of (2) clean particles at (3) suitable temperatures within their thermoplastic range and for (4) sufficient time, Fig. 5, to permit adjacent atoms or molecules to improve their relative alinement and establish cohesive forces as a bond. Such pressure-welding can occur almost instantly between particles of a steel shaft in a steel bearing or of a steel sheet in a steel draw die when the insulating film of lubricant breaks down. Pressure above the yield point of the material assures intimate contact. Further improvement may be accomplished by mechanical working of the mass, forging granules into even more uniform compactness and filling cavities which molecular or atomic forces could not close. Oxidation of surfaces forms an effective barrier against forming molecular bonds and accordingly a protective atmosphere or enclosure is usually required during the welding or sintering period.

Where porosity is desired the particles need only join at random points of contact. However, voids among the cohesive particles may be reduced by pressure or substantially eliminated by plastic working during or between applications of heat sufficient for recrystallization. As lead and tin recrystallize below atmospheric temperatures, it is reported that their powders may be pressure welded without added heat at pressures down to 500 lb. per sq. in. Tungsten is an outstanding commercial example of converting from powder to practically flawless, ductile wire though temperatures are necessarily extremely high.

Fig. 6 indicates the progressive steps in the conversion of molybdenum powder to drawn wire four times as dense. The density is plotted to show elimination of voids and gradual approach toward perfect atomic packing of the crystal space lattice. Along similar lines and more familiar to sheet metal workers are the comparisons in Table I in which are shown

experimental steps and changes of properties in conversion of copper and iron particles to ductile form.

Fig. 7 shows how electron activity and intermolecular ties, changing with temperature, effect the mechanical strength of a typical "pressure-welded" thermoplastic. The material is a synthetic resin, vinylidene chloride polymer, extruded from heated powder and stretched into tubular form. The solidly frozen crystalline state exists below about 30 or 40 deg. F. As the temperature increases, the material becomes softer and more easily changed in shape. Methods of producing the resin permit varying it from a flexible, moderately soluble material having a softening point of approximately 158 deg. F. to a hard tough thermoplastic having a softening point of 350 deg. or more. Softening points here refer particularly to an approach to fluidity favorable to compression and injection molding.

Creep

In Fig. 7 compare the range of softening or decreasing strength with the range of increasing creep for the same and other materials in Fig. 8. Here, cantilever beam specimens of several thermoplastic resins and one thermosetting resin acting as a binder in a fibrous laminating material, were stressed for four days at 1000 lb. per sq. in. maximum fiber stress, followed by four days of recovery. Creep and the thermoplastic state are obviously coexistent, for when the intermolecular forces are weakened even in the lower part of the range, a moderate force acting over a sufficient time will gradually cause change of shape in excess of elastic recovery (i.e. permanent set). Lead pipe and lead roofing creep in the course of years, for lead is also in the lower part of its thermoplastic range at atmospheric temperatures.

Rate of creep in thermosetting materials is more constant (Fig. 8) up to limiting temperatures (about 212 deg. F.). Fig. 9 showing time and creep relations for a laminated phenolic thermosetting material would also seem to indicate an ultimate decrease in the rate of creep. While this might be traceable in part to taking up slack or better alinement of fiber chains (see Figs. 11 and 12, Part II) the coincidence of time at different loads might also suggest a time limit on the stability of the plasticizer used in this mixture.

Speed in Thermoplastic Flow

Between the solidly frozen crystalline state and the fluid molten state,

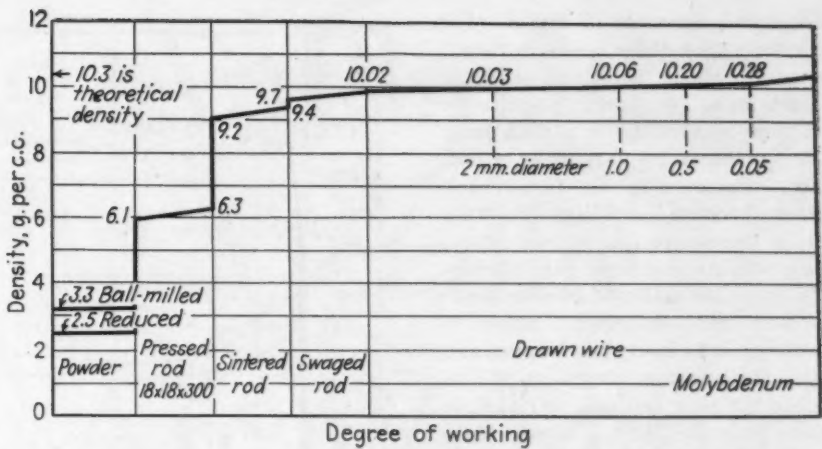


FIG. 9—Creep of a canvas base laminated phenolic thermosetting material at two different loads. Courtesy Westinghouse Electric & Mfg. Co.

the flow of thermoplastic materials (metallic or organic) varies from creep, comparable to glacial movement, to the almost turbulent flow of injection molding. In Fig. 10 tests were run at two different testing machine speeds (slow compared to commercial operation) which illustrate effects of speed upon elongation⁹ and upon strength which, of course, is also the resistance the material offers to

flowing or changing its shape. It has been demonstrated in rolling steel¹⁰ again that resistance increases with

⁹ Refer to p. 209, Plastic Working of Metals—Crane.
¹⁰ See Fig. 233, p. 263, ditto.

speed in the thermoplastic range up to a certain point. At any particular temperature this variation depends upon the time required to stress-relieve or equalize the bonds between

TABLE I
Effect of Alternate Compression and Recrystallization On Properties of Copper and Iron from Powdered Metals

	Density g./cc.	Brinell Hardness	Ultimate Tensile, psi.	Elongation in 2 in., %
COPPER				
Pressed, at 50 tons/sq. in.....	7.47	73	970	0
Sintered, at 1470° F., 8 hr.....	7.90	34	16,000	9.5
Repressed, at 50 tons/sq. in.....	8.39	70	22,200	4.0
Resintered, at 1470° F., 8 hr.....	8.37	39	25,500	17.0
Cold rolled, 25% reduction.....	8.33	97	37,300	4.0
Reannealed, after 25% reduction..	8.35	39	17,000	16.5
Cold rolled, 50% reduction.....	8.57	109	44,400	2.5
Reannealed, after 50% reduction..	8.59	41	24,600	22.0
Cold rolled, 75% reduction.....	8.80	117	49,000	1.0
Reannealed, after 75% reduction..	8.82	44	32,700	27.5
IRON				
Pressed, at 50 tons/sq. in.....	6.23	69	470	0
Sintered at 1830° F., 8 hr.....	6.68	47	27,000	10.0
Repressed, at 50 tons/sq. in.....	7.27	67	30,500	4.0
Resintered at 1830° F., 8 hr.....	7.23	63	34,900	20.5
Cold rolled, 25% reduction.....	7.39	107	50,500	2.0
Reannealed, after 25% reduction..	7.40	63.5	30,600	15.5
Cold rolled, 50% reduction.....	7.67	133	63,000	1.0
Reannealed, after 50% reduction..	7.69	68.5	32,800	21.5
Cold rolled, 75% reduction.....	7.74	161	77,700	0
Reannealed, after 75% reduction..	7.75	68.5	33,800	26.0

From "Plastic Deformation," C. C. Goetzel, Amer. Electro Metal Corp. in "Powder Metallurgy," Amer. Society for Metals, Cleveland, 1942.

molecules as indicated in Fig. 5. The work done upon these bonds in forced change of shape generates heat in proportion to the speed. Extrusion of a copper tube from a cold slug, while unsuccessful at slow speed, works commercially in fast crank presses because sufficient internal heat is generated to correct interatomic strains and turn out substantially annealed material despite about 1000 per cent elongation. Speed is also essential in many hot forging and plastic forming operations, as of Lucite bomber nose sections, to complete the operation before the blank chills. In other materials, toward the lower end of the plastic temperature range, speeds of severe forming operations may have to be reduced to avoid fracture by permitting stress relief to keep up with the strain applied.

(To be continued)

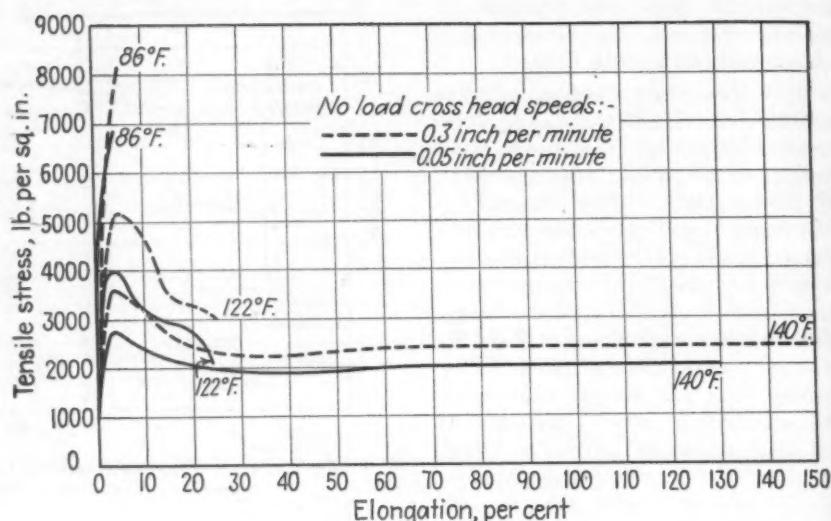


FIG. 10—At temperatures within the thermoplastic range (of methyl methacrylate) increased testing speed results in higher yield point, greater resistance to plastic flow, and greater elongation to point of fracture. From DuPont Lucite data.

Leather V-Belts Introduced

A NEW application of flat, full grain leather in contact with pulley sheaves has been put in a V-belt by the Charles A. Schieren Co. As indicated in the illustrations, flat leather side walls sheath a laminated leather core. A high coefficient of friction is developed by the tenacious grip of the flat leather walls and makes slack running possible with attendant economies of wear on both V-belts and bearings, without power loss through slippage.

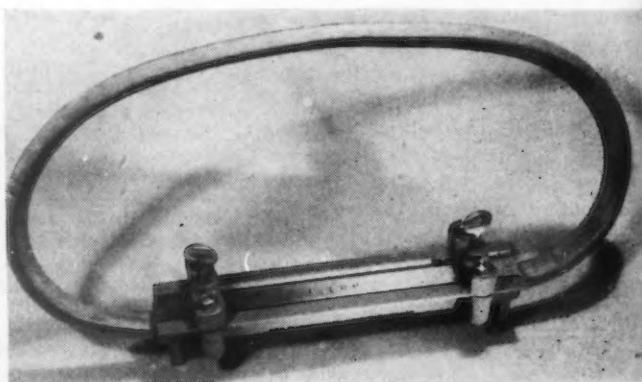
By reason of the ability to splice the belts at the machines, the dismantling of machines for belt changes and adjustments have been largely eliminated. Furthermore, the need for large and costly belt inventories is eliminated. Heretofore, it was necessary in using ordinary endless V-belts to carry a stock of multiple sizes in various lengths for each size, depending upon the variety of V-drives in operation.

Schieren V-belts are supplied in long rolls. When a new belt is needed, the predetermined length is

cut from a roll of the cross-section required and a splice made with the special equipment provided. This consists of a miter box for preparing a feather bevel with an ordinary carpenter's saw, and an adjustable clamp. By applying cement to the joints and clamping, the belt is made endless in a few minutes. The traditional salvage value of flat leather belting carries on with the new V-belt. Short pieces may be spliced to make belts of re-

quired lengths or kept for repair purposes for belts broken through carelessness or accident.

Two years of service tests under strenuous wartime requirements have disclosed the effectiveness of the new leather V-belts. Even oil soaking has not lowered their efficiency, it is claimed.



RIGHT

TYPE of adjustable clamp used to splice a leather V-belt. A more elaborate type of clamp is also available for longer and larger section belts.

LOWER RIGHT

PREPARING the feather bevel in a special miter box preparatory to splicing a leather V-belt.

LEFT

CROSS-SECTION of a new Schieren leather V-belt, showing the flat leather side walls, permitting advantage to be taken of the well known frictional properties of full grain leather.



Automatic Metallic Arc Welding

By F. C. Neal, Jr.

Arc Welding Specialist, General
Electric Co., Dallas, Texas

... The author reviews the various types of automatic metallic arc welding equipment, and points out the economic and technical factors relating to their application.

WITH the critical shortage of skilled arc welding operators and the need for fully utilizing existing welding equipment, automatic metallic arc welding is playing an ever-increasing part in our war production. Phenomenal increases in welding speeds over hand welding methods are being reported, with the output per welding operator increased as much as 500 per cent on some welding jobs.

Tabulated below are some of the war products on which the more common automatic metallic arc welding processes are being used successfully to save time, reduce costs and improve weld quality:

A—Bare or lightly coated electrode in coils:

Submarine net floats
Trench mortar projectiles
Bomb casings
Machine gun water jackets
Depth charge casings

B—Extruded coating electrode in cut lengths:

Shell casings
Machine gun water jacket housings

C—Heavily coated electrodes in coils:

Tank wheels
Pressure vessels
Destroyer turbine diaphragms
Boilers

D—Atomic hydrogen process:

Rifle cartridge clips
Aircraft tubing
Truck axle housings
Accumulator shells
Propeller blades

E—Submerged melt welding process:

Deck plates
Bulkhead stiffeners
Tank transmission housings

Not all are welding jobs, however,

can or should be done by the automatic process. In order to determine whether a particular job may be done successfully with automatic arc welding equipment, the part must first be welded successfully by hand. It also must meet the following requirements:

1—Welds must consist of straight seams or circular seams.

In order to realize fully the savings possible with automatic welding, it is necessary to keep the arc going as many minutes out of every hour as possible. If the seams to be welded are short, in many cases the time required to set up the job will more than cancel the savings made possible by the higher welding speeds of the automatic process. Also, since the automatic welding head must either move over the work or the work move under the head, in general it is necessary to limit the joints to be welded to straight and circular seams Fig. 1. It is possible to design equipment to follow irregular shapes, but in most cases welds of this kind can better be made by hand.

2—The fit-up between the parts to be welded must be uniform and close.

The automatic welding head travels at a uniform speed, in a uniform direction and holds a uniform arc length. Obviously, it cannot hesitate when it comes to a portion of the joint

where the fit-up is poor or the joint is not regular. Conditions such as this will frequently result in poor welds and will require patching by hand.

3—The parts to be welded must be positioned so that the welds are made in the flat or horizontal position.

As already mentioned, the automatic welding head traverses the joint and holds certain uniform, preset conditions. This precludes the possibility of making welds in the vertical or overhead position where it is necessary to manipulate the arc as the weld is made.

4—Production of parts to be welded automatically must be large and restricted to similar or identical shapes.

Since most joints require special positioning, turning or clamping devices, production must be large enough to justify the expenditure for this special equipment.

Once a welding job has been analyzed and found to meet all of the above requirements, it is then necessary to determine which of the several available automatic metallic arc welding processes should be used. Frequently, this can be determined easily through an analysis of the base metal to be welded or of the code or specifications which must be met. Most of



the armament, ships and war products now being arc welded are covered by definite specifications to assure a uniform product from all contractors.

Application of Bare Wire

If the code or specifications are not particularly rigid and the main requirement of the welded joint is that it be air or water-tight under relatively low operating pressures, bare or lightly coated electrodes are frequently used. Although such welds are often porous, this is no obstacle unless it is necessary to grind the surface of the weld and expose the porosity. The design of some welded structures is such that the welds lie along the neutral axis where they are subject to relatively small stress, even in the case of shock loads. In addition, a well-made joint, using lightly coated electrodes, may show only 10 or 15 points less ductility and only slightly less ultimate tensile strength than the corresponding weld made with a heavily coated electrode.

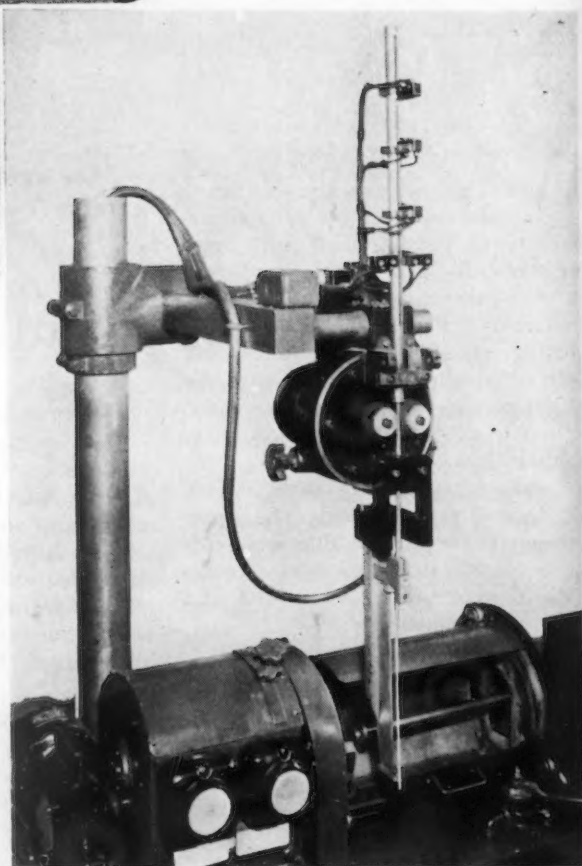
If the physical requirements of the weld are rather high and the base material is of mild or low alloy steel, automatic welding equipment using an extruded coating electrode in cut lengths, a heavily coated electrode in coils or the submerged melt welding (Unionmelt) process will be required. Automatic welding equipment designed to use the standard cut lengths of 14 and 18 in. electrodes is being used principally for making short welds where the complete joint can be made with a single stick of elec-

ABOVE

FIG. 1—Automatic arc welding equipment being used to fabricate automotive axle housings. With this equipment, electronic control is used to feed the electrode into the welding arc at a preset rate or at a rate controlled manually.

RIGHT

FIG. 2—Stick electrode feeding attachment applied to automatic bare wire welding head for making high quality welds on small diameter cylinders.



trode. When more than one electrode is necessary to complete the joint the resultant crater may be found objectionable and also the time saved may be small, compared with doing the same job with hand welding.

Stick Feed Head

Applications of the stick feeding device, Fig. 2, which may be added to a standard bare wire automatic arc welding head have been limited principally to circular welds on shell cases and other small cylinders where high-quality, flat-contour welds are required. This equipment has the advantage of making possible the use of any diameter or type of welding electrode. It is usually possible to

so choose the electrode for a particular job that stub end loss will be kept to the minimum.

The stick feeding device is an attachment for a bare or heavily coated type automatic arc welding head, which allows the use of single sticks of standard manual welding electrode. The electrode is inserted in a clamp in the stick feeding attachment and is fed into the arc under controlled conditions until the electrode is consumed. At this point the clamping

arrangement automatically returns to its starting point where it is ready for the insertion of a new stick of electrode.

High-quality welds on moderately heavy base material frequently are most economically made through the use of an automatic arc welding head that uses a heavily coated electrode in coils, Fig. 3. One form of this equipment uses an electrode having a woven, flux-impregnated coating which is quite flexible and which will adhere to the core wire as the electrode is unrolled from a reel and fed into the arc. Current is introduced into the electrode by milling a narrow slot through the coating as it passes through the head and allow-

ing a set of current-carrying fingers to ride in the slot against the core wire. An arrangement such as this is used on both straight and circular seams and it is possible to equip the head with an oscillating attachment so it will deposit wide layers.

For making butt or fillet welds on sections $\frac{1}{4}$ in. thick and above, the submerged melt process will in many cases prove to be most economical because joints may be made in single or relatively few passes at high welding speeds using currents from 600 to 800 amp. and even up to 2000 amp. or more on plate of 1 in. thickness and above.

For certain hard-to-weld metals none of the above automatic welding processes is satisfactory. Frequently, the automatic atomic hydrogen process is the only automatic welding process which may be applied, Fig. 4. For welding aluminum, some stainless steels and certain special alloys, particularly in thin sections such as 0.030 to $\frac{1}{8}$ in. or where the weld requirements call for extreme ductility or for the weld metal to have practically the same composition and physical properties as the base metal, automatic atomic hydrogen welding is the sole choice, excepting hand welding.

Regardless of which automatic welding process has been chosen for a particular job, it is relatively easy to visualize the savings which may be expected through its use. The average hand welding job will have a cost analysis approximately as follows:

Factor	Per Cent
Labor	50
Electrode	33
Power	12
Fixed charges	5
Total	100

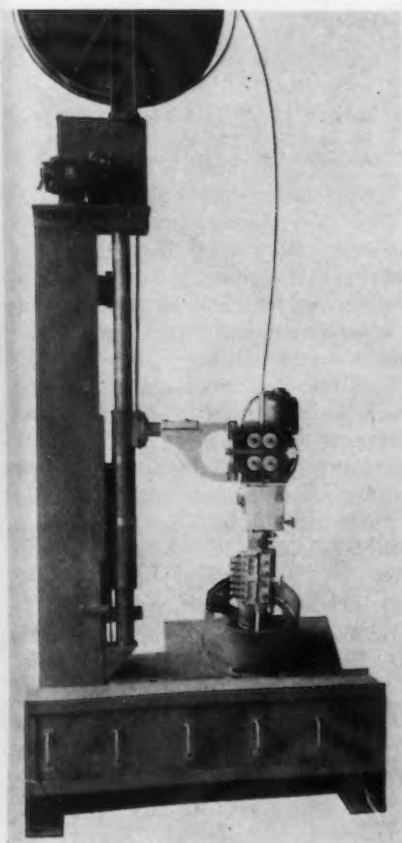
Since the cost of labor for a hand welding job is the principal item, it may be expected that through the reduction of this item the principal savings may be made with the automatic process. Time studies on the average arc welding operator show that the actual time that he is welding will be somewhere in the range of 25 to 50 per cent, exceeding the upper figure only in extremely rare cases. It has also been found that

his duty factor and therefore his production drop off sharply towards the end of the day so that his average production may be much less than that indicated by time studies of relatively short periods.

The reduction in production toward the end of the day is often caused by operator fatigue because of the strain of holding an accurate arc length and traversing a seam, hour after hour, on production line welding. Because of strict code requirements and rigid inspection, it is also frequently necessary to re-weld some of the joints. It has been found that the number of re-welds and rejects increases rapidly toward the end of the shift.

Higher Duty Factor

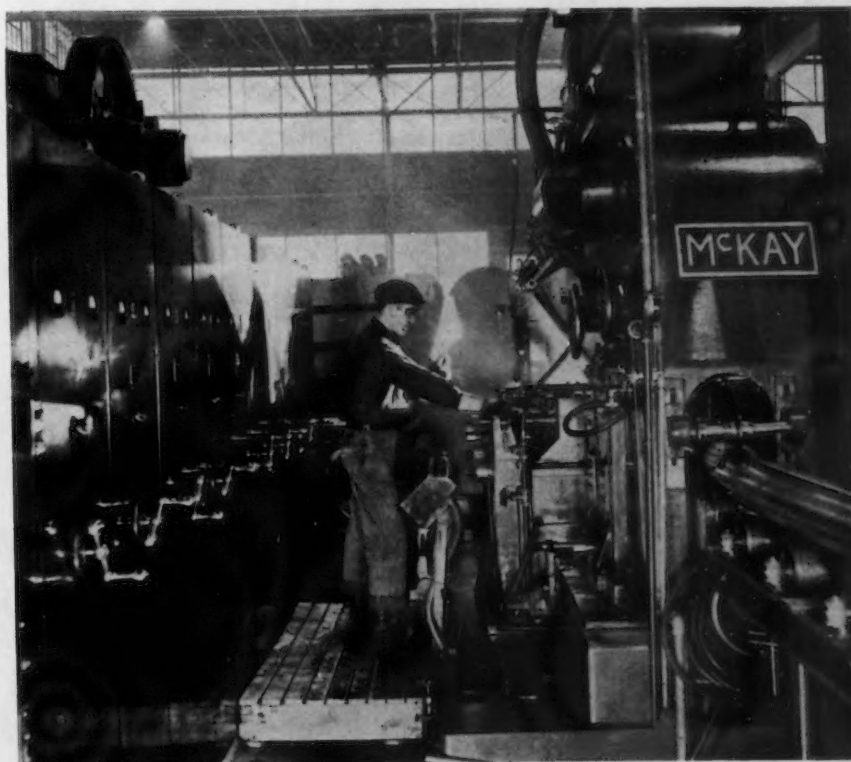
With automatic arc welding equipment, it is possible to maintain the arc 80 to 90 per cent of the total time. Since the controls of the automatic welding equipment are present for particular jobs and the operator is under no physical strain, this high production rate may be maintained throughout the day and the number of rejects—considerably fewer than

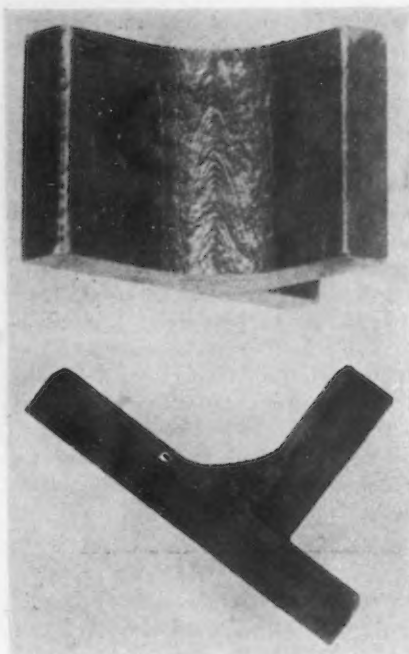


ABOVE

FIG. 3—Automatic welding head and rotating fixture for making circumferential fillet welds on wheels of medium tanks. A slot is milled in the heavily coated electrode wire to establish electrical contact just before the wire feeds into the arc.

FIG. 4—General Electric multiple-arc atomic-hydrogen welding equipment used for welding tubing for automotive axle housings at the plant of the Clark Equipment Co. Flat strips of medium carbon steel are formed into tubing and passed by propelling and squeezing rolls under a series of 10 atomic hydrogen arcs. Finished tubing is very strong and ductile, the weld being subjected to severe swedging, expanding and forming in subsequent manufacturing operations. Control of operations is grouped in a compact pushbutton panel just above the operator's knees. Electrical equipment for supplying power to the arcs and electronic control for the electrode feeding motors of the welding head are housed in cubicles behind operator.





LEFT

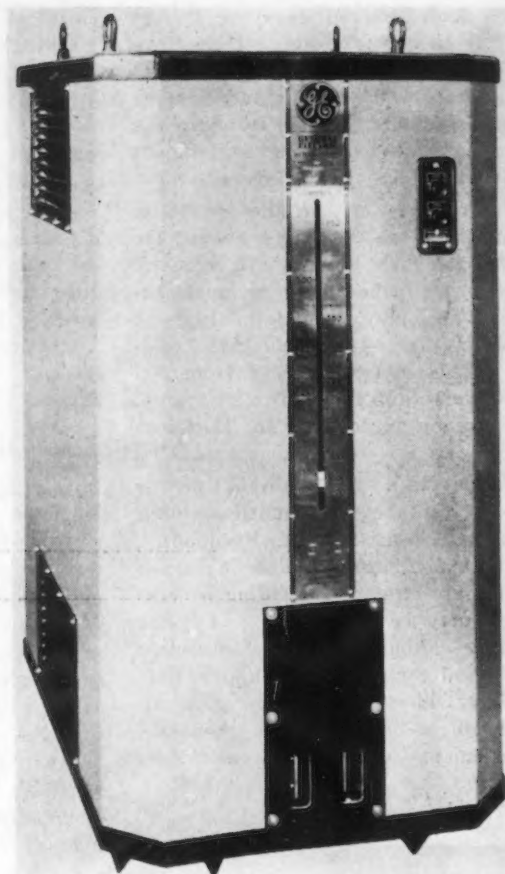
FIG. 5—A $\frac{3}{8}$ -in. flat fillet weld, and macrosection, made with an automatic heavily coated arc welding head using $\frac{1}{4}$ -in. diameter coiled electrode operating with 510 amp. a.c. at a travel speed of $13\frac{1}{2}$ in. per min.

o o o

RIGHT

FIG. 6—A 1000-amp., 440/550 to 80 volt a.c. transformer type arc welder, a most frequently used power source for high quality automatic arc welding equipment.

o o o



with hand welding—will show no increase toward the end of the day.

Perhaps the greatest recommendation for automatic welding is the fact that operators can be trained to handle this equipment in an extremely short time. They need not be skilled welders or for that matter be able to weld at all. Such operators can frequently be hired more easily than skilled welding operators.

The same operator may be able to tend more than one automatic welding equipment at one time if the machines are conveniently located. While one machine is being loaded and the arc started, the other machine can be welding. Limit switches may be employed to stop the welding head automatically and return it to the starting position for the next weld. When the welding operator tends two welding heads, the welding labor cost per unit is reduced to a very small fraction of the cost for hand welding the same joint. Reduction of the number of rejected pieces and those requiring patching will result in a still further reduction in unit cost.

On hand welding jobs, electrode stub end losses often run 10 to 20 per cent or more of the total amount of electrode purchased and this waste is principally responsible for the relatively high cost of electrodes. When the automatic welding process uses coiled electrodes, stub end loss is cut to practically zero, a further substantial savings in favor of automatic welding.

Higher Welding Current Used

Since the welding current on auto-

matic welding processes is introduced into the electrode very near the arc, it is often possible to use welding currents 10 to 15 per cent higher than is possible with hand welding, without overheating the welding electrode, damaging the coating or reducing weld quality. This, of course, results in an increased electrode melting rate (see Fig. 5) which in turn, results in higher welding speeds than with hand welding. These higher welding currents result in greater power consumption by the d.c. set or a.c. transformer-type welder, Fig. 6, used as a power source. This, however, does not mean that the 12 per cent power cost in the above tabulation will be increased, as it still takes the same number of kilowatt-hours to melt a pound of electrode whether hand or automatic welding is used.

In changing an existing welding job from hand welding to the automatic process, careful attention should be paid to the source of welding power since this power will be used at a considerably higher duty factor and at higher welding currents. The following is a simple formula for calculating the size of a single-operator type arc welder when the welding current and duty factor are known.

$$\text{Welding set rating} = 1.25 \sqrt{\text{duty factor} \times \text{welding current}}$$

The duty factor (expressed as a decimal: 80 per cent = 0.80) is usually taken as the number of minutes out of each 10 that the arc is actually going. On extremely long seams or multi-pass circular seams where the time required to make a single joint exceeds 10 min., the duty factor should be considered as 1.00. The next large size standard rating welding set as indicated by the formula should be chosen. For instance, should the rating be calculated as 280 amp., obviously a 300-amp. set should be chosen.

In selecting the type of arc welder for use with automatic welding equipment, a.c. offers so many advantages over d.c. that at present it is used almost exclusively wherever automatic arc welding is applied with heavily coated electrodes or with the submerged melt process. Among the principal advantages of a.c. arc welders are: (a) more uniform strength and faster welding due to the absence of troublesome magnetic disturbances in the arc; (b) Savings in maintenance since an a.c. welder of the transformer type operates as static equipment; (c) and consider-

able saving of power because of much higher efficiency.

Fixed charges will, of course, be considerably increased when a job is changed from hand welding to an automatic process because of the increased amount of equipment necessary. These charges include overhead, interest and depreciation on the equipment. The cost analysis will vary over rather wide limits, because one job may require very elaborate fixtures which must be written off over a definite period of time or perhaps on a definite number of welded assemblies, while another job may call for much simpler tooling. The sav-

ings made possible through decreased labor and electrode costs per unit will frequently offset these increases in fixed charges many times over.

Although the considerations involved in deciding whether or not a particular welding job should be done by an automatic welding process and the choice of the proper process may appear complicated, actually there is no guess-work involved. Reliable manufacturers of automatic welding equipment have equipment available in their laboratories where sample welds may be made on the same base material and under the same conditions as will later be experienced in

the manufacturer's plant. From the data taken on these sample welds and tests made on the joints, it is possible to determine definitely the physical properties to be expected and also the savings which may be made through the use of an automatic welding process. These same equipment manufacturers also have skilled welding engineers available to supervise the installation of automatic equipment and to train the plant personnel to adjust and operate it.

In our present desperate battle against time, automatic welding should be thoroughly investigated for every large production welding job.

Silica Gel Prevents Engine Corrosion

A SIMPLE, quick packaging technique for guns, planes and machinery that prevents rusting and corrosion damage during the weeks and months that these metal war implements await delivery has been made possible by the development of a chemical that not only sucks half its weight in moisture out of the air, but also signals workmen when the humidity inside a package reaches the point where rusting occurs. The chemical is granular silica gel, offered by the Permutit Co., New York City, under the trade name of Sec-A-Sil.

Until recently, the common method of checking corrosion of war goods was to coat or "slush" metal parts with heavy grease in an attempt to keep moisture off exposed surfaces. Before using, the grease-coated parts has to be degreased in solvent or vapor baths. Moreover, slushing often proved ineffective in preventing corrosion during prolonged exposure to high humidities, which delayed putting vital ordnance and other equipment to work at the front.

The use of silica gel protects inside as well as outside surfaces of aircraft engines, machine guns or other metal parts because the relative humidity of the entire package is kept below 20 per cent, at which range the chemical action of corrosion cannot take place. Silica gel granules do not swell, dissolve or show any visible effects of the absorbing process. Their water-absorption is a simple physical action.

Visible from the outside, enclosed in the package is a humidity indicator—a card containing cobalt-impregnated silica gel, which changes color as the air within the package changes in humidity. When the air is dry, the

impregnated granules are a deep blue, but as the humidity of the package increases, the granules change through violet to pink. A pink color warns the inspector that the silica gel has absorbed moisture up to the limit of its capacity and no longer protects the package, probably because the moisture-proof wrapper is leak-

ing. Fresh silica gel bags can then be inserted in the package.

In packaging aircraft engines, silica gel plugs are screwed into spark plug and other openings to protect inner surfaces, a 2 oz. cotton bag of the granules is stuffed into the carburetor, and larger bags of silica gel are tied to each cylinder. A humidity indicator card is mounted on one end and a moisture proof Pliofilm bag is then drawn over the engine. The engine is lowered into a wooden box, the open ends of the bag heat sealed and the box closed. A window cut in the shipping box permits the inspector to observe the indicator card without disturbing the package.

BELOW

A BAG of silica gel stuffed into the carburetor of an aircraft engine protects inside surfaces from corrosion. Silica gel packaging eliminates "slushing" and degreasing operations, which give little protection to the hard-to-reach interiors subject to salty and moist air in transit.

RIGHT

H EAT sealing the Pliofilm bag over a Ranger aircraft engine makes an airtight package. The bag keeps moisture out and the silica gel absorbs the moisture that was present in the sealed-in air or that which seeps through the covering. The humidity indicator card can be seen through the bag. These packages can withstand exposure to temperatures as high as 170 deg. F. and as low as 40 deg. F. below zero.



Residual Stresses in

LAST Jan. 16 the tanker Schenectady split in two and sank at her dock at Swan Island, Ore., Since then the Truman Committee, the steel companies, the shipbuilder and the American Bureau of Shipping each have issued statements about the cause of the failure. (THE IRON AGE, Mar. 18, pp. 89-90B, Mar. 25, p. 128).

The layman, and perhaps engineers as well, cannot reconcile the divergent assertions and accusations about the responsibility for the failure of the welded structures cited above. However, the explanation for the divergence is quite simple. It is this: The effects of thermal stresses in large welded structures are unpredictable.

The Schenectady was not the only welded ship to run into trouble due to welding stresses, as Henry Kaiser pointed out last winter. Since this is so, this uncharted field of thermal residual stresses constitutes a major challenge to the engineering and metallurgical profession that must be met squarely and immediately to help the war effort. Failures due to these stresses in large welded structures can approach disastrous proportions and do cause a needless waste of manpower and materials. The Fed-

By **EVERETT CHAPMAN**
Chairman, Welding Stress Committee
The Engineering Foundation

o o o

eral government should accord such research a sufficiently high priority on manpower and materials, and the engineering profession and the metal working industry should accord it the full support of their energy and resources.

Castings and other smaller structures are stress relieved by putting them into the annealing furnace. Unfortunately heat treating isn't feasible for such structures as a welded ship, a bridge or a tank. Other methods of protecting these structures from failures in which residual stresses are the dominant factor must be sought through research prosecuted as vigorously as possible.

True, much research is already under way. Some of the steel companies and some of the shipbuilders are carrying on studies to determine the why of the failures, whether they reflect shortcomings of the steel or oversights on the part of the welder. Unfortunately, such researches will of necessity be focused to an appre-

ciable extent upon the single aim of establishing the blame, that is, determining whether it is the steel's fault in the case of the steelmaker or ascertaining whether the particular welding job was at fault in the case of the shipbuilder.

We of the engineering profession and we as citizens of a nation at war cannot afford to depend for a solution to this vital problem on the results of piecemeal research. We must not indulge ourselves in the wasteful luxury of haggling over the blame, especially when there is now established a going organization equipped to carry on an overall research into welding stresses not from the view point of the insurance company, the shipbuilder or the steel company, but purely from the viewpoint of science and engineering.

Over seven years ago the Welding Stress Committee was organized as a subcommittee of the Welding Research Committee of the Engineering Foundation. During that time it has been formulating its plans for thorough-going analysis of this problem. The present personnel of the Welding Stress Committee is listed in an accompanying table.

As a result of the deep study given to this subject on the part of the

FIG. 1—Influence of the type of loading on a test specimen on the apparent yield point, ultimate strength and ductility of a single analysis of steel.

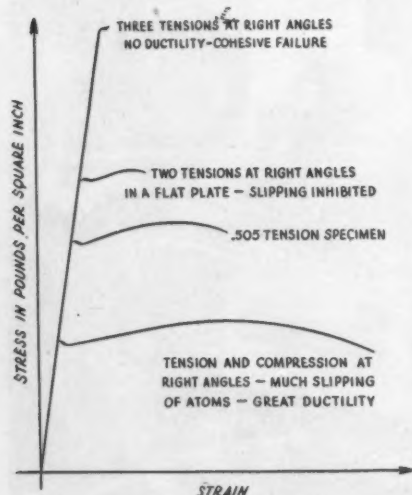
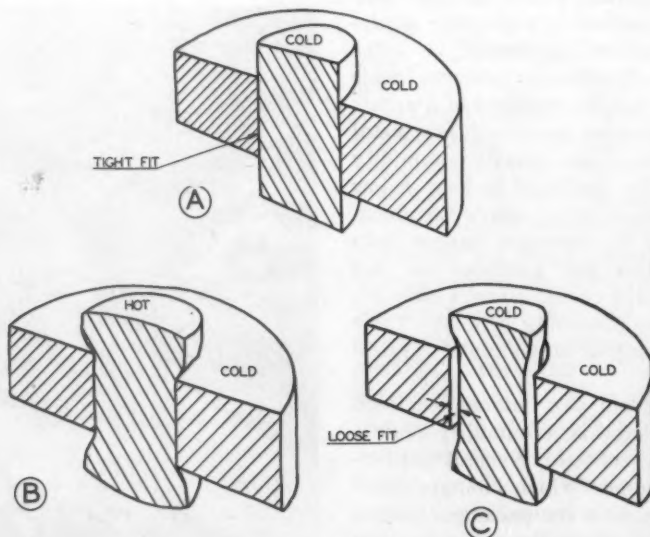


FIG. 2—Effect of a cold restraint (disk) on a plug that is heated and cooled. If these two pieces were one, a severe internal stress would be set up as a result of this heat cycle.



Welded Structures

—A Challenging Problem

considerable number of experts involved, there has been a gradual clarification of their perspective, the development of an enthusiasm which makes overtime study possible and the gradual orientation which is now leading to a rational breakdown of the broad problem into specific projects to fill the gaps in our present knowledge.

Within this broad framework some of the researching projects have been started and others are ready. The need now is to expand and intensify the research into all phases of the problem.

The following paragraphs outline the problems that must be faced and the method of attack decided upon by the Welding Stress Committee.

Limitations of Tension Test

The physical properties of steel such as ultimate strength, yield point and ductility are ordinarily ascertained from the tension test on a 0.505 in. steel specimen. Under this form of test, steel will exhibit a cheesy action of stretching which is the ductile behavior of steel that enables a structure to adapt itself to actual working conditions.

The 0.505 in. specimen is tested as a rope and, as such, is a slender member carrying a load in a uni-axial tension—a load in a single direction.

... At present the effects of thermal stress in large welded structures are unpredictable. Before a full understanding can be had of how much more load a structure already preloaded with residual stresses can carry, it will be necessary to extend the boundaries of our knowledge of the behavior of steel under a complex system of stresses. The basic experiments necessary to establish that knowledge have been outlined by a committee made up of topflight research engineers and metallurgists. It is their hope that industry will subsidize individual projects of an interrelated, cooperative research program so that spectacular failures like the tanker "Schenectady" can be avoided.

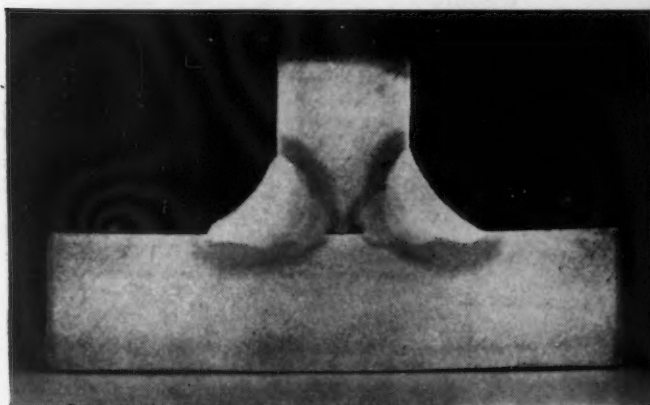
Under actual working conditions only rarely is steel loaded in this manner, as for example in suspension bridge cables. In the great majority of structures the steel carries its load in the form of flat plates or sizable masses of three dimensions.

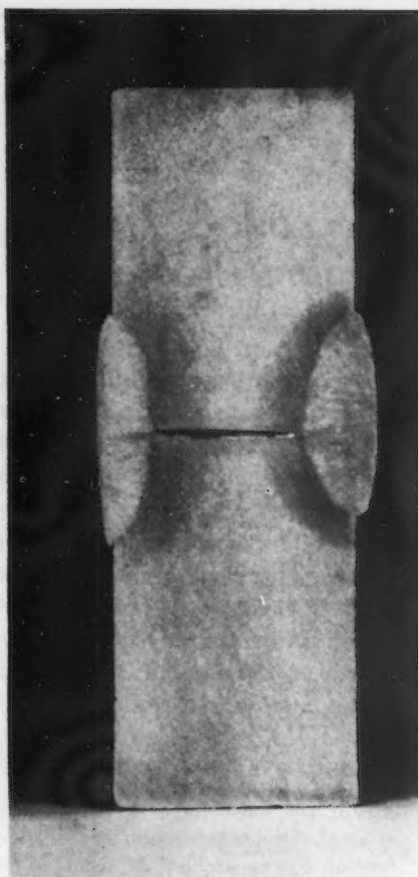
The basis of the ductility exhibited by the standard tension test specimen lies in the ability of the steel atoms to slide with reference to one another like a deck of cards when wiped between the hands. A second tension force applied at right angles to the first tension force somewhat inhibits this sliding behavior. A third tension force applied at right angles to the other two may completely nullify the sliding action. The steel now cannot exhibit the plastic behavior which is

one of the most important attributes of steel. Under the conditions of three tension forces applied at right angles to each other the steel atoms can no longer slip with respect to one another, and a failure under such conditions consists of the atoms being pulled apart—a failure known as a cohesive failure. These cohesive failures at the ultimate atomic strength of the material exhibit no ductility whatever and the fracture will be coarsely crystalline and the metal will act like a brittle material.

Conversely, if there were placed at right angles to the initial tension force a second force which is compressive force—one which would aid the slipping of the atoms with respect to one another—we find a great

FIG. 3—The photoelastic model shows the stress concentration produced by the notch effect of an improperly welded joint.





deal of ductility, far more than that exhibited by a standard tensile test specimen.

Fig. 1 shows schematically what happens to the yield point, ultimate strength and ductility as the manner of loading changes from the condition that aids the slipping of the atoms to the condition where slipping is entirely inhibited.

The Basic Premise

We then come to the basic premise that underlines the work of the Weld Stress Committee, namely—that the physical behavior of steel varies with the type of imposed stress system.

One of the most dangerous manners in which steel is loaded in a compound or multi-axial manner is the type of loading produced by thermal stresses. These are dangerous and damaging stresses because at the moment very little is known about them.

A simple illustration will serve to illustrate the mechanism of the formation of thermal residual stresses (see Fig. 2). Assume a plug inserted in a disk of steel, the fit being absolutely tight and the two pieces of steel at the same temperature. This is illustrated in the upper left hand corner of Fig. 2. Heat the central plug, maintaining the outer disk

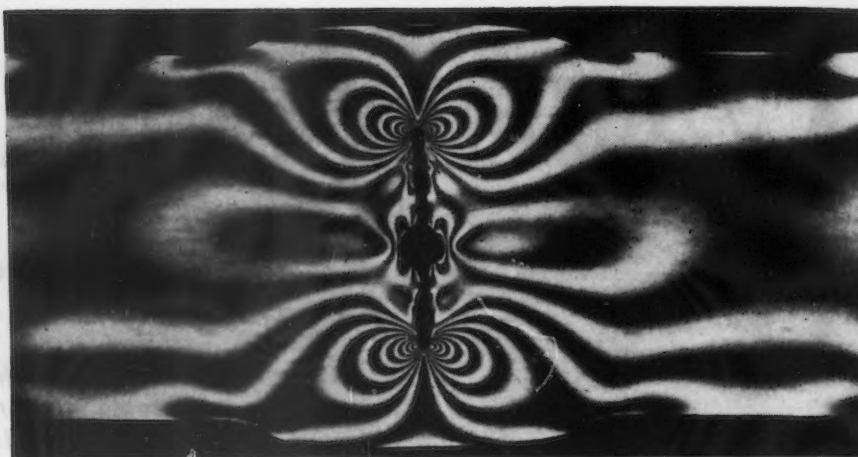


FIG. 4—Lack of fusion in this joint results in the equivalent of a tear and resulting high stress concentrations, as the photoelastic model shows.

at its original temperature. This could be done by quickly passing a large electric current through the plug. Elementary physics teaches that when material is heated, it tends to expand in proportion to the temperature applied to it and furthermore, that this extension force is irresistible. The cold disk, however, does not expand because it is maintained at its original temperature and it serves as a cold restraint or an adjacent rigidity. The plug in attempting to expand meets this cold restraint or adjacent rigidity, and since it cannot move in a radial direction, it will upset or plastically flow in a direction along its axis to take the mushroom shape shown at B.

Now let us cool off both pieces of steel to the original temperature. The plug which was formerly a tight fit is now loose, and the metal has actually been displaced in another direction due to upsetting against the cold restraint afforded by the outer disk.

This is a case of non-uniform temperature distribution and the law of expansion and contraction is irreversible; the metal expanded truly when heated enough, but when it contracted, it did not return to its original shape.

Suppose that the disk and plug were one piece of metal at the start and that a central portion of this disk was heated in the same manner. The heated portion will go through the same cycle of expansions, upsetting and contracting as has been described, but what resulted in the first illustration in a loose fit now appears as a severe elastic strain. The heated portion will be stretched outward to meet the contracted rim and a severe set of elastic strains will exist.

Note that the heated portion will be under severe radial tension while the outer rim will be in a state of radial compression. This constitutes a system of bi-axial stresses the nature of which is quite unknown.

Supposing that this disk was now

FIG. 5—In order to understand the phenomena causing thermal stresses, it will be necessary to investigate all the elements charted.

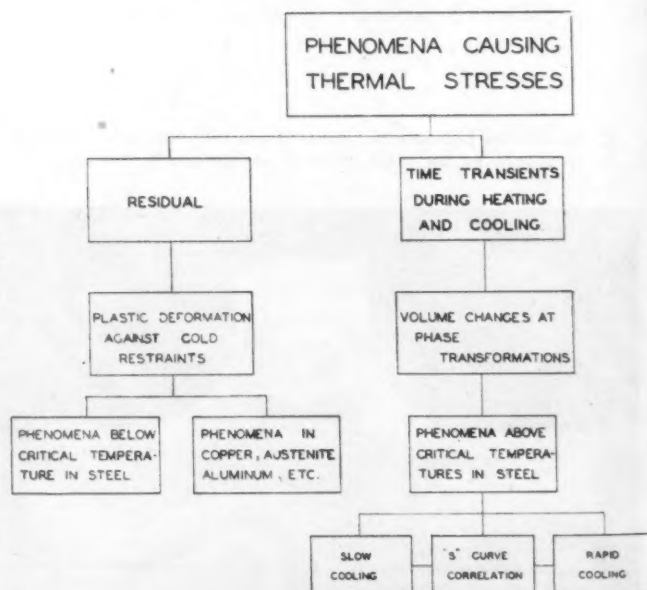
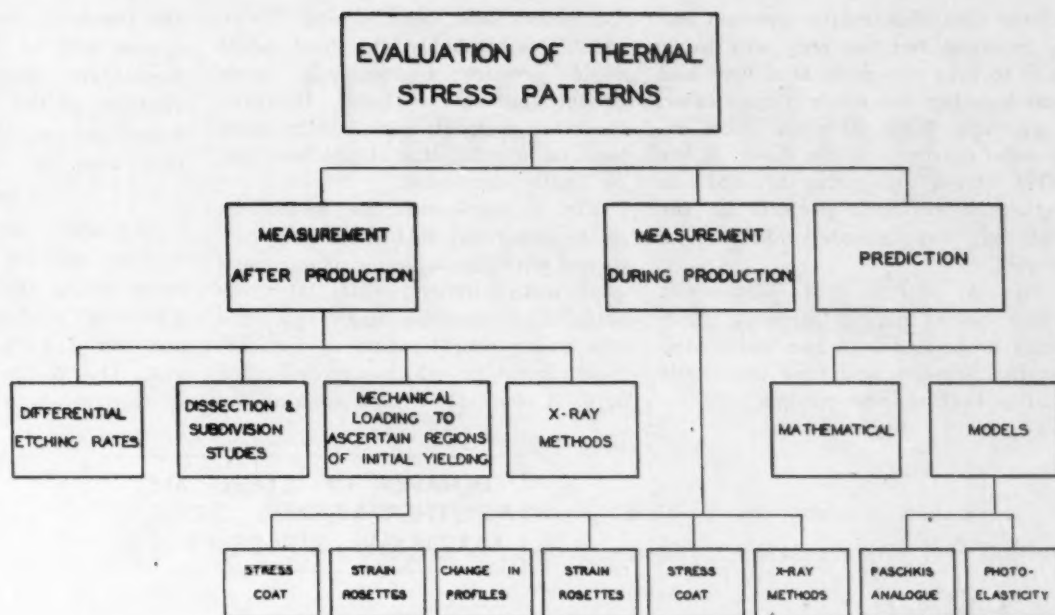


FIG. 6—Full evaluation of thermal stress patterns involves all these possible methods of measurement and examination.



to be used as a flywheel of some sort. This brings up two important questions. What are the usable structural properties of this disk that would enable it to serve adequately as a flywheel? In the face of this thermal preloading, how much ductility of the steel remains?

The Basic Question

We thus come to the basic question which the Weld Stress Committee is attempting to answer: *In a structure preloaded by residual stresses, what are the usable structural properties?* This question is of importance in the design of every welded structure too large to be furnace-stress relieved.

A thermally preloaded steel structure is like a pile of coil springs which have been compressed and secured in the compressed condition. Suppose now that one of the strings which is holding the springs has a

frayed or tattered strand in it. In the steel structure this would be represented by a notch or an incipient rip. A sudden change of temperature or an undue load may cause the tattered strand to break and release the entire stored up energy of this spring system. This example explains why in some of the recent large structural failures only a foot of weld has been found to be ruptured while hundreds of feet of plate were cracked.

Incipient rips and notches result when a joint is improperly welded. The extremely dangerous stresses created by these notches are shown in typical photo-elastic models, Figs. 3 and 4. Improperly made welded joints are thus the fuse caps for the dynamite charge. They are the pin prick in the bubble.

But even if a welded structure has perfectly fused joints—no rips, no

notches, no sharp corners, no undercuts—there would still be the question of how thermal loads have affected the safety of the structure.

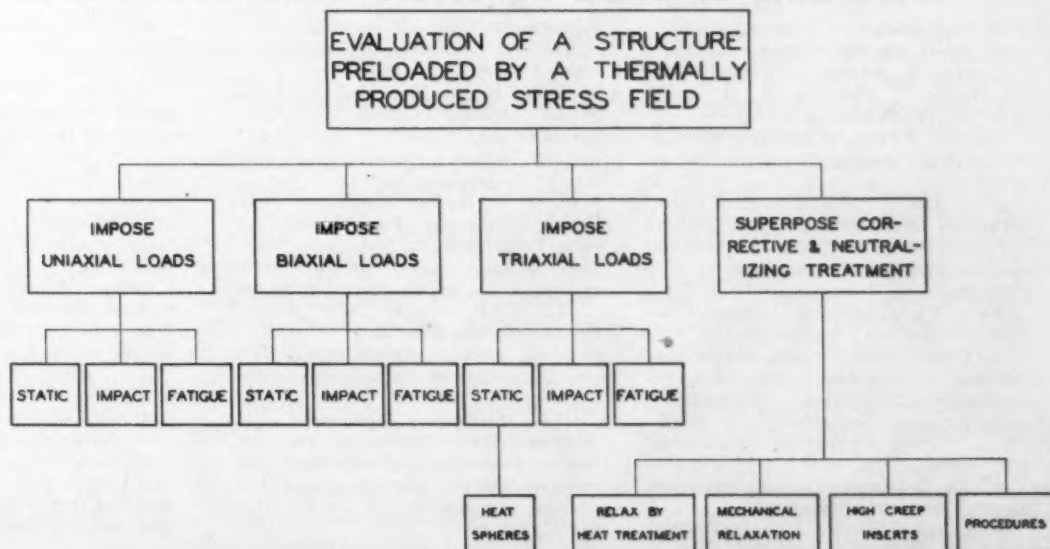
Basic Experiment

This brings us to the basic experiment that the Weld Stress Committee has outlined for its work namely:

- (A) Produce controllable multi-axial stress field in a structure
- (B) Measure these stress fields
- (C) Evaluate the residual structural properties by imposing on these stress fields uni-axial, bi-axial and tri-axial stresses.

Fig. 5, 6, 7 and 8 show the breakdown of the research job that the Weld Stress Committee has finally decided upon. This large program consists of a number of pieces which are unknown parts of a jig saw puzzle. It is the opinion of the com-

FIG. 7—In order to determine what are the usable physical properties of a structure preloaded by thermal residual stresses, this series of experiments is proposed.



mittee that this entire question can be resolved, but the only way to do it is to take one piece at a time and knit together the whole picture later.

Through funds obtained from industrial sources it is the desire of the Weld Stress Committee to subsidize individual research projects at the cost of approximately \$10,000 a project.

Fig. 5 outlines the phenomena which cause thermal stresses. This study is divided into two parts—the residual stresses and time transients during heating and cooling.

Corrective and Neutralizing Treatment," is probably the field which could produce a relatively quick, though partial solution. However, the other research work outlined must be done in order that the picture may be finally completed.

Fig. 8 represents the breakdown of the important field of research concerned with the behavior of steel and other metals under multi-axial stress fields. The committee has many projects under consideration at the moment, some of which are indicated here. A concerted attack upon all the

the research the only knowledge acquired will be data about the particular test specimen that was used. Because of the many variables, the knowledge cannot be extended to general cases.

Conclusion

The above paragraphs outline the serious challenge with which the metal using industries and the engineering profession are confronted and the way this challenge can be met. The Welding Stress Committee is convinced that an organized,

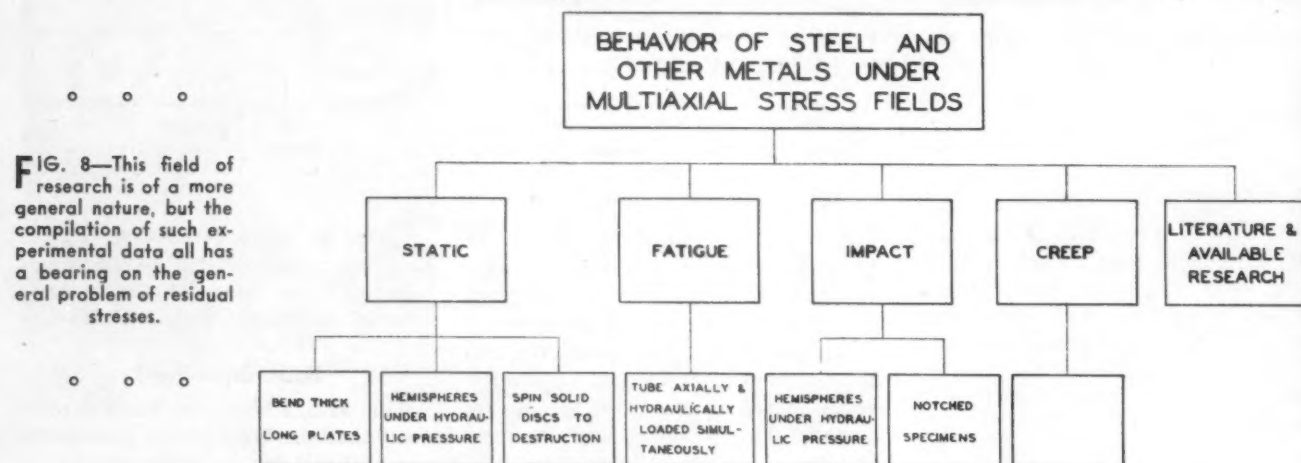


Fig. 6 illustrates the breakdown of another important part of this research, namely, the evaluation of thermal stress patterns. Suitable methods of measuring three dimensional stress fields are not too clear at the present time although there are several promising attacks charted in the various categories shown in Fig. 6.

In the exploratory work charted in Fig. 7, the block called "Superposed

small pieces of the problem is needed, as it is not a problem which can be solved by a single research project that includes many variables. It is useless, for example, to weld a piece of plate and measure the stresses. Enough progress has been made to know that the stresses will be in the neighborhood of the yield point of the material. Furthermore, the stress fields will be of such a random nature that at the conclusion of

thought-out research program, such as it has developed, is the only way disasters similar to the splitting of the Schenectady can be averted. The boundaries of knowledge must be pushed out past the present frontiers if this problem of residual stresses is to be solved. And in view of all that is at stake—this task should draw a No. 1 rating in the war effort.

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The Gating of Castings

... By far the greatest single cause of iron foundry defectives is incorrect gating, a subject thoroughly investigated in this British paper.

A CLOSE relation exists between the standard of gating practice and the level of foundry defectives, it was pointed out by E. W. Harding, of the metallurgical staff of the International Meehanite Metal Co., Ltd., at a recent meeting of the London and East Midland Branches of the Institute of British Foundrymen. Any means of reducing these defectives is of direct and pressing interest, said Mr. Harding, adding that the importance of gating is actually two-fold: First, in respect of casting quality—in its influence on the cleanliness and soundness of the casting, and, second, in regard to cost and efficiency—in its direct and close relation to losses on defective castings.

The effect of gating practice on defectives has been convincingly demonstrated over a number of years by means of accurate defectives records. These records take the form of classified lists of defects and it is the duty of the castings inspector to compile the list of defectives, classified by nature of defect, for each day's production. A weekly scrap analysis sheet is made from these daily records and this is the basis on which causes of defects are determined and corrective action applied.

Experience obtained in this way for many foundries has shown that by far the greatest single cause of defectives can be classified under the heading of "incorrect gating," mainly resulting in sand and slag defects. The average proportion due to this cause has been found to range between 30 and 50 per cent of the total defectives. It should not be necessary to emphasize the importance of such a loss in labor, fuel and supplies, particularly at the present time. If many of the points brought up in regard to good gating practice appear to be obvious, justification must lie in the fact that they are overlooked in practical operation, as evidenced by the results.

In any attempt to reduce defective castings it is essential to search for basic causes rather than try to give individual treatment to each defective piece. This is where the analysis of defects serves a useful purpose, in indicating the operating conditions responsible for the bulk of the defects. That is to say, the record of defectives gives the *types* of defects encountered on the various jobs, and the summary and analysis of these defects for the whole production provide the key to the *causes* of defects. Defects due to incorrect gating consist mainly of sand and slag inclusions, caused by lack of efficient sand and slag traps, by loose sand or sharp edges in gating system, by dirty or badly made pouring basin, and by no choke at ingate; misrun and coldshut, caused by incorrect gate distribution, by slow pouring rate, and by poor basin design; shrinkage, caused by incorrect position of gate in relation to riser; mold or core scab, caused by excessive mold or core surface erosion of badly placed gates; and distortion, caused by incorrect gate distribution.

In the correction of gating defects, it is by the application of certain fundamental principles that efficient practice is obtained. It is not intended to imply that there is only one correct way of gating any casting. There may, in fact, be many ways of running a casting to get equally satisfactory results from the quality point of view; though there may be considerable differences in the costs for the various methods. The point, however, is that only those ways conforming to sound principles can be effective in the long run. Before going on to consider practical examples, these principles will be discussed brief-

ly. It will be understood that particular reference is made throughout to iron-foundry practice, though naturally the principles involved apply to other materials.

The function of the gate is obviously to introduce molten metal into the mold, but certain conditions must be fulfilled in the operation. These are principally efficient sand and slag trapping, correct heat distribution, minimum mold surface erosion, and suitable rate of pouring.

Sand and slag trapping is probably the most important of the conditions. The principles involved in sand and slag elimination are the difference in density of metal and sand—permitting of separation by flotation in pouring basin, runner bar, whirl gate, etc., and the relative viscosities of molten metal and slag—the lower viscosity of hot metal permitting it to pass through openings which retain liquid slag. This is utilized mainly in strainer core practice.

These principles have been translated into practice by the development of a large variety of gating systems, all of which fall into two fundamental divisions—those in which the dirt is floated out and those in which it is strained out. Many modifications and combinations of gates have been tried, but the systems mainly employed for slag-trapping are: Cope runner bar with drag ingates; cope projection gates; flow-by gate; syphon skim gate; whirl gate, and strainer core.

The ideal condition is as nearly as possible a uniform temperature in all sections of the casting during solidification. This serves to minimize warping and internal stresses, and gives best conditions for a uniform structure in all sections. For any given



THE greatest single cause of foundry defectives can be classified under the heading of "incorrect gating" mainly resulting in sand and slag defects. These defects can be minimized by conforming to some basic rules of sound practice.

casting design, locating metal entry to suit the various sections is the chief means to this end.

In cases where metal sections are so varied that feeding of the heavier section is normally necessary for soundness, two systems of metal entry are available.

The first involves gating into the lighter section, so that the heavy section receives the colder metal, thus balancing the natural temperature gradient due to varied cooling rates. By this method, feeding of the heavy section may often be eliminated since practically simultaneous setting occurs. The method is naturally limited in application to certain designs and sections, but in experienced hands yields efficient results. This method also makes for good machinability in the light sections.

The second system involves gating into the heavier section, which is then rendered sound by feeding. This is the method normally recommended where sections are too heavy to respond to the first system. In its most efficient development it follows the principles of progressive, directional solidification, and takes the practical form of gating into the riser. By regulating the pouring speed it is possible by this system to reduce feeding to the minimum; for example, in casting a gear blank with heavy rim and hub, gating into a riser on the hub, with hot metal and slow pouring, can yield a sound rim without risers.

A knowledge of gating implies the ability to reason out what will happen when the metal is introduced into the mold in a certain way. A useful picture can be obtained by drawing

isothermal lines to represent the heat gradients during solidification. By this means it is possible to avoid incorrect practice and see more clearly the most suitable points of metal entry, the parts to be fed and, in general, the system of gates best suited to the particular type and design of casting.

The importance of locating and designing gates to minimize sand erosion during pouring is obvious but frequently overlooked. Points requiring consideration here are velocity of molten metal at various points in the gating system, relation between height of fall and velocity, impingement on exposed and unsupported surfaces, sharp edges of sand in gate and mold, etc. Account must be taken of the fact one is asking a rather fragile object, made of sand and clay, to withstand the weight and rush of molten metal, often travelling at high velocity and frequently at temperatures approaching the fusion point of the sand itself. Even under best conditions the factor of safety is relatively low and the high proportion of defects traceable to gating indicates that even this low safety factor is rarely obtained.

The question of top or bottom pouring frequently comes up for discussion and is influenced by this matter of mold erosion. Like many gating decisions, it is largely a matter of compromise between a number of factors, some of which are opposed to one another in the method required. Top or joint gating is ordinarily to be preferred, mainly on metallurgical grounds, since it favors correct thermal lines and renders more accessible the parts to be fed. However, sand erosion from either mold or core is accentuated with top pouring and special precautions in gate location and mold material and condition must be taken in these circumstances.

Points needing particular attention in regard to sand erosion are: Avoid sharp corners and edges in gating system; avoid locating ingates so that metal strikes directly against a core or sharp corner or fragile part of the mold; avoid running metal onto a surface from which it is drained as the metal drops to a lower level in the mold; avoid constriction of ingates at casting—a nozzle effect is thereby produced, with high metal velocity. A slight flare of the ingate at the casting is recommended to reduce velocity.

Pouring speed is determined by the total ingate area and the head of metal from basin to ingate. It is naturally a vital factor in avoiding misruns and obtaining soundness and cleanliness. Generally, the lower the fluidity of the metal used, the faster must

be the pouring speed for sound and clean castings.

The nature and design of the work being poured, however, is the main factor in the rate of pour, and no hard-and-fast rule can be laid down to cover all cases. Experience over a large variety of castings in many different foundries has shown that an approximate relation exists between satisfactory pouring speed and casting weight. By plotting pouring rate in tons per min. against casting weight in tons, it is seen that the rate of pour increases rapidly with increase in casting weight. The range is wide, varying from 10 tons per min. for heavy castings to about 1/10 ton per min. for light castings. Practical experience and judgment are normally depended upon to control this variable, but some measure of correction by applying known standards would do much to restrict variation due to this factor. Other conditions besides casting weight naturally influence rate of pour (casting design, presence of cores, flat top surfaces, metal fluidity, etc.). These should be included in any tabulation of standard rates of pour, which would apply, of course, specifically to the particular foundry's practice and conditions.

One of the most important facts to bear in mind is that, no matter how well a runner bar is designed or located, unless the total ingate area bears a correct relation to that of the other parts of the gating system, then it will be inefficient and may be directly responsible for defective work. This follows from the principles governing efficient slag trapping, particularly trapping by flotation. Sufficient reserve of metal must be available, right from start of the pour, to keep the slag-trap full. In other words, the gate must be choked. This is very obvious and elementary, but often overlooked.

The particular arrangements employed for preventing entry of slag will naturally influence the degree of choking, but a safe mean range lies within 20 to 40 per cent of the downgate area. This assumes, of course, that the basin is kept full and that the only restriction to metal flow is the area of the various members of the gating system. Strainer core work is naturally a different matter. Here choking takes place between the downgate and the strainer core and, provided that the core is not located too far from the casting, the area of ingate is not a material factor in obtaining clean castings.

No gating system can be efficient that neglects the design and condition of the pouring basin. The basin is

an essential part of the system. Its main functions are to allow time for separation and flotation of sand and slag before metal descends to the downgate, and to permit quiet entry of iron into the downgate at constant velocity, that is, avoiding whirlpooling at basin outlet. Both of these objects are attained through correct basin design and dimensions. A further condition is that the basin must be properly made (preferably by pattern), so that loose sand and sharp edges are absent and that sand erosion during the pour is at a minimum. Poor basin design and condition is undoubtedly one of the principal causes of dirty castings, and the conclusion is that, however simple and obvious may be the principles underlying basin construction, the matter is neglected in practice.

Mr. Harding's paper was accompanied by a slow motion film on metal flow and gating systems, primarily to show what a film study of this nature could demonstrate. The film was produced by Greenlee Foundry Co., an American Meehanite licensee.

In the discussion following presentation of his paper, Mr. Harding was asked what he would consider the correct diameter to keep the strainer core going with seven holes $\frac{1}{8}$ in. in diameter and $\frac{1}{2}$ in. thick. He replied that it would be quite easy to calculate, that the system needed a slightly decreased area of filter, but in strainer core practice the question often arose whether it was better to have a large number of small holes or a small number of large holes. If there were a large number of small holes there was a much bigger resistance to metal flow for the same area, and therefore total area in this case should be higher.

Mr. Harding was asked whether in the case of large dry-sand or green-sand molds, with what depth of runner was it necessary to step the downrunner. Was it advisable to choke the metal in the downsprue, making the metal wash over a step, and would it be necessary to make the step by means of a core? Even with a large runner basin, with efficient slag trap, it would still be necessary to employ some form of choke in the runner.

He replied that in most cases where there was such a height, a step was advisable; normally it would be a dry sand mold, in which case it would resist the wash of metal. Any sand washed from the gate would presumably be trapped in the runner bar which should follow that step. Undoubtedly there was a need for some form of choke with any runner system. Many people thought that by

pouring a dry sand mold with a clean pouring basin, there was no necessity for any system of holding back dirt. He had seen very clean dry sand molds poured with very clean metal and had found slag in the trap, for example, in the syphon gate. The dirt might come from the ladle or mold, and one must prepare for the worst conditions. One could not afford to waste a casting on the assumption that there was no dirt present.

Mr. Harding was asked to amplify the point that the one aim behind the design of runners and ingates was to compel the metal to follow the contour of the mold and cores, if possible without disturbance. It was mentioned that dross would enter the runner box, and more dross or scum would be picked up as the metal proceeds through the down-runner into a dirt trap, and providing the design of the dirt trap and the dimensions of the down-runner and ingates, and their correct position had been ascertained, running troubles to a very large extent would be eliminated. Unfortunately, some of the larger sized castings of a jobbing nature must be made in existing box parts that very often did not lend themselves to this method of running and in relation to these larger and intricate castings it was quite a different problem, from that of the simple type of castings dealt with. Actually, the practice of casting an open sand mold was the practice of the old jobbing founder. Another point was that no dimensions were given of the runner basin, and presumably the addition of a plug or stop might be an advantage, thus preventing any slag or dross from the ladle finding its way down the runner, instead of trusting to the runner bar trapping this dross.

Mr. Harding said that the standard of inspection of a small casting was generally much more severe than that of a large casting. The same principles apply, however, whether the castings are large or small. Advantage was taken of the fact that sand and slag separate by flotation. With a dry sand mold there was less danger of sand wash than with green sand, but this did not mean that one could afford to omit a dirt trap from a dry sand mold. It was a safeguard, and one should not take a chance. Many people used plugs in the pouring basin. There was, however, one danger, if the seating was not good it would do more harm than good, owing to the first metal trickling into the mold causing chilled drops before the main stream was released.

Asked to express an opinion as to

the best way to run a circular casting weighing about 110 lb., Mr. Harding said it would be advantageous if the mold could be gated, using a riser over the hub. By fitting a strainer core in the runner bush over the riser, the entry of sand or slag into the casting could be prevented.

It was remarked that horn runners were supposedly the least turbulent form of running, yet the film accompanying Mr. Harding's paper demonstrated the point that metal spurted into the center boss of the wheel casting. If a casting of the type mentioned in the previous question was run with a horn runner in the same way, would not the weight of metal in the boss tend to hold back the incoming metal and prevent this turbulence or spurting.

Mr. Harding said one must be sure with a horn runner that the mold was quite clean, and this was a difficulty. Drawing the runner pattern was likely to leave loose sand in the mold. Another factor was that the horn runner had a low opening area, and the metal entering through that opening must have a high velocity. In the case of a flat job, there was a tendency to sand wash. The flat runner was usually preferable because of the tendency to get sand in the mold. However, for some circular work, gating into the hub with the horn-gate was sometimes an advantage.

It was suggested that tactics should be altered for different molds. When dealing with a turbine casting of 30

tons weight, it seemed preferable to start top running. In spite of everything said for top running, it did not invariably save striking of the sand at the bottom of the mold.

Marine Turbines

It was agreed that such castings were usually run from the bottom along the flanges, and that top gates were often employed to freshen up the rising metal. It was then mentioned that top pouring was not always possible, and even not desirable and that every job must be considered on its own merits.

It was remarked that while Mr. Harding laid great stress on the importance of keeping the castings clean, and yet in the films the molds were poured with iron which had not been skimmed, and there was a fair amount of slag on the ladle. It was usual, of course, to hold the slag back, but the chief danger was the first metal going down the downgate and carrying slag with it into the mold. On the question of the spinner, it was considered rather surprising that Mr. Harding laid such stress on throttling the stream between the downgate and the spinner. With whiteheart malleable, a notoriously dirty metal, particularly with small casting, it was remarked that the metal was throttled at the ingate. In that way, with properly proportioned ridge and spinner, it was impossible for any slag to enter. This method was very suitable for small malleable castings, but, of course, could not be applied to larger castings. Mr. Harding was

asked whether he had any experience with a dummy spinner in which the metal entered and left a small spinner before entering the feeder. Incidentally, the steel foundries were appreciating the spinner feeder nowadays. There was one fact regarding the relative merits of the ingates in the top and bottom of the casting where either were applicable, where, of course, the casting was not run through a feeder, and there were no shrinkage troubles. Probably the metal entering the bottom entered quietly and the hot entering metal ran through the colder metal and levelled the temperature, so that at the moment of solidification the casting was practically uniform in temperature. Personal experience of bottom ingates was that of cleaner and sounder castings.

Mr. Harding, referring to the slag on the ladle, said the slag was deliberately retained on the ladle to show it in the runner system, but, of course, the ladle was actually cleaned in normal practice. Precautions were taken mainly against the first metal, and that was why, with an ingate on the end of a runner bar, the first metal did the damage at that point. This also applied to the whirl gate. It was not necessary to choke the entrance to the whirl gate, but it was necessary for the shrink bob. As to the spinner, the metal flowed to the outside first and the angle of outlet was the important point; it must always be in the reverse direction to the inlet.

New Data on Sand Behavior

THE behavior of mold and core surfaces under the elevated temperatures of casting is visually demonstrated in a unique color motion picture produced by Harry W. Dietert, head of the company bearing his name in Detroit. The film has been shown at several foundrymen's meetings and attracting favorable comment.

The use of the movie technique to show the entire cycle of testing operations makes it possible to slow these down and study them in detail. Intense study of this sort is intended not so much to bring out new conceptions of what happens during casting as to develop unified agreement on the steps in the cycle.

This combination of color and slow speed, coupled with arrangements whereby elevated temperature tests were taken through a port in the furnace to show the behavior of the

sand throughout the entire tests provides an unusually clear idea of exactly how a sand behaves under high temperatures.

Conclusions which can be drawn from inspection of this film are extremely interesting. Spalling, for example, appears to be the result of a number of factors, such as unequal volume change of sand or core sectional areas, low ductility of sand or core surfaces making it unable to accommodate the hot expansion or hot shrinkage, large differences in hardness or adjacent areas or in the rate of heating of two such areas, or a lack of void spaces between sand grains to allow for growth of the grains.

Similarly, spalling can be reduced by arranging to secure equal volume change of adjacent sectional areas by providing sufficient hot permeability

or by greater equality in heat input, hot deformation, hot strength and hardness. Using material with available void spaces is helpful, as is the obtaining of a surface possessing hot deformation which avoids lack of ductility.

The film seems to provide the lesson that collapsibility is the result of the oxidation of the binders, or of a composition change of the binder to a non-binding material. Hot strength appears to result from the pyro-strength of the binder, a composition change of the binder to some stable ceramic material at elevated temperatures, or the melting of one or more materials to form a viscous liquid at elevated temperatures.

Arrangements for obtaining the film may be made by writing to the Harry W. Dietert Co., 9330 Roselawn Ave., Detroit, Mich.

The Future of Tinplate

QUICK freezing and dehydration, as well as alternative metal containers, will be important new factors in the tinplate industry, which has, since the opening of the present century, shown a continuous and relatively steady growth. Quick freezing and dehydration, the two most important new developments in food preservation, are making rapid headway and both appear to be particularly applicable to the handling of foodstuffs in bulk, the Tin Research Institute points out. Though neither process now seems likely to compete with the small metal container containing a small unit of food, they may find important markets among large consumers.

Alternative metal containers, as a significant factor, result from the introduction of cold rolled steel strip in large coils, the continuous process of electrolytic tinning, and the use of lacquers combined with a bonderized surface. In cases where truly successful new techniques and substitution have been effected, reversion to pre-war practice cannot be expected.

Analyzing the effect of the new developments, the Institute considers the introduction of cold rolled strip in large coils as wholly favorable to the tinplate industry.

It provides a steel base which is both cheaper than and superior to the former hot rolled plate. Its greater smoothness facilitates a uniform tin coating, and in the U. S., hot dipped coatings had already, in the immediately pre-war years, been reduced by about 10 per cent, from 1.5 to 1.35 lb. per base box.

Among the facts on electrolytic tinning now established, says the Institute, are its convenience because of its adaptability to strip in coils, obviating the necessity of separate handling of the small sheets needed in hot tinning. The fact that any desired amount of tin can be applied gives a product that can be matched with the use in view.

After a study of the porosity of tin coatings of different thickness on British and American tinplate, the Institute concluded that the porosity and liability to corrosion vary regularly with the tin coating thickness, whether applied electrolytically or by hot dipping. In this connection, R. H. Lueck, head of the technical staff of the American Can Co., is quoted as follows:

... With war time shortage of tin and with technical advances in the canning metal and food processing fields, the even tenor of the tinplate industry has been vastly disturbed. The Tin Research Institute herewith evaluates the new developments in terms of post war expectations.

"The presence of some tin on electrolytic plate provides it with a corrosion resistance superior to that of bonderized steel. . . . In light weight coatings necessary to effect a substantial conservation of tin, it cannot be said to possess the corrosion resistance of hot dipped coatings of 1.25 per cent. . . . Plain cans from this (electrolytic) plate without an inside enamel coating have not been giving a satisfactory account of themselves with a number of food products for which plain hot-dipped plate is admirably suited."

The accompanying table gives comparative performance of electrolytic and hot dipped tin plate:

The third alternative type of container is based on the use of special lacquers applied to steel base sheets which have been Bonderized. Neither the lacquer nor the Bonderized surface alone gives adequate protection, but in combination a surface is obtained which under emergency conditions is serviceable for many food products. It is, however, inferior in this respect to a combination of lacquer and a thin electrolytic coating and as it is quite unsolderable it cannot replace tinplate for food container bodies unless there is a complete revolution in the method of their manufacture.

For other than canned foods, for example, dry packs, coffee, dried milk, etc., and non-foods such as tobacco and oil, there will be a considerable use of thinner coatings, the Institute believes, adding that such coatings will be inferior in appearance. The cheaper coating, combined with the better steel base now available, will find new markets and displace other less-durable packaging materials such as glass, cardboard, etc.

In sum, so far as the post-war conditions when tin is once again freely available are foreseen by the Institute at this time, the tinned container will still be the most widely popular method of food packaging and the thickness of the tin coat used will, on the average, be little less than formerly."

Methods of measuring the thickness of tin coatings on steel and other metals are outlined in the Institute's publication No. 115. The methods described depend upon the chemical dissolution of the coating, with the tin thickness determined by weighing the specimen before and after removing the coating, or by completely dissolving the specimen and determining the tin by analysis, or by measuring the time required to dissolve the coating and comparing with the time required for a coating of known thickness.

Comparative Performance of Electrolytic and Hot Dipped Tinplate

Type of Plate	Weight of Tin Coating, Lb. Per Base Box	Hydrogen Evolution Test, Hr.	Service Life with Y. C. Peaches (Failures per M. After 413 Days at 100 Deg. F.)	Service Life with Dried Prunes in Syrup (Days to 50% Failure at 100 Deg. F.)
Electrolytic	0.44	13.7	1000	100
Electrolytic	0.48	15.7	544	133
Electrolytic	0.60	25.8	0	172
Electrolytic	0.68	21.4	44	201
Electrolytic	0.75	28.4	0	215
Electrolytic	0.97	40.3	0	258
Hot-dipped	1.40	52.6	0	321

Service life values are shown for plain cans, not enamelled.

New Equipment . . .

Finishing

• • • New improvements in cleaning machines, corrosion control material, protective coatings, non-corrosive paper, and industrial paints are illustrated and described in the following pages.

A UNIT for the cleaning, rinsing, polishing and drying of small parts too difficult to clean manually has been introduced by *L & R Mfg. Co.*, 54 Clinton Street, Newark, N. J. The machine is equipped with a small aircooled motor and a work basket plus nesting basket subdivided into three compartments. By snapping on the thermostatic switch, a surging centrifugal motion of the basket is produced with speeds varying from high to low. Dull, greasy, oil stained

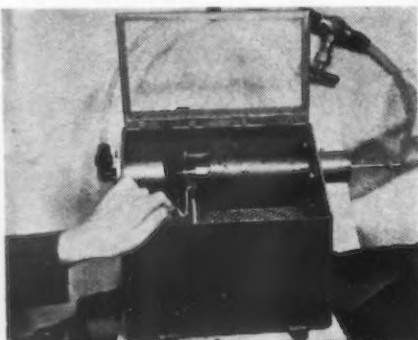


units are said to emerge from the machine bone dry, ready for the assembly line.

Bearing Washer

A COMPACT, portable machine designed to clean and oil small bearings for airplane instruments without exposing them to room air or handling has been developed by *American Foundry Equipment Co.*, Mishawaka, Ind. The bearing washer consists of a solvent container, a motor driven solvent pump, spray nozzle, a solvent filter and bearing adapters. An air hose connection providing clean filtered air can be built into the unit. In operation, the bearing race is slipped over the adapter and pushed into the spray nozzle entrance.

Solvent, under high pressure, is forced between the race and the balls of the bearing. By twirling the operating



knob, all surfaces of the raceways can be exposed to the solvent. The bearing is removed from the adapter by means of a stripper mechanism and is discharged into a container or cellophane bag. The solution is continuously recirculated and is filtered to remove all minute dirt particles. All operations can be viewed through a non-breakable plastic door.

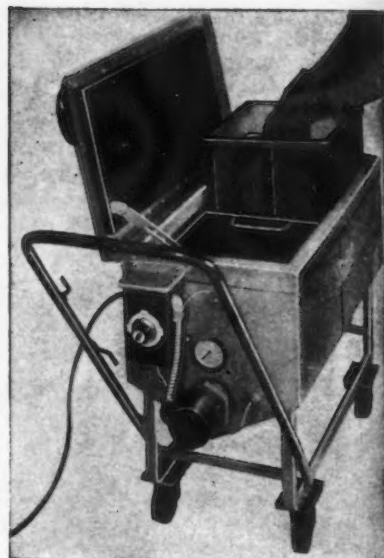
Spray Gun

TO overcome the difficulty experienced in securing aluminum and other wartime materials, the *Binks Mfg. Co.*, 3114 Carroll Avenue, Chicago, is now producing the Thor No. 17 gun, which is claimed to be a dependable substitute for either the Thor No. 7 or No. 2, and can be used for all work done by these models.



Degreasing Tank

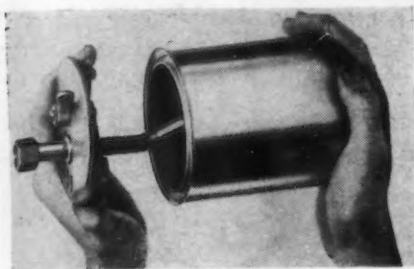
A PORTABLE, insulated, electrically heated dipping tank, the Dipmaster, Jr., is offered by the *Aeroil Burner Co., Inc.*, West New York, N. J. Holding 12 gal. of solution, the unit is equipped with a heating element located inside on the bottom of the tank where it is completely submerged. Standard equipment includes two dipping baskets in which the parts are placed, a bi-metal type ther-



mometer and a thermostatic control equipped with a dial and knob to shut off the heating element manually and to maintain automatically any desired temperature between 100 to 550 deg. F.; also a drawoff cock for emptying the tank. The electric heating element can be removed whenever any cold solutions are used or the bottom of the tank is to be cleaned. Larger stationary models are available, ranging up to 600 gal. capacity, and they are heated by kerosene, city or liquefied gases, with removable immersion tube heating units in the tank.

Paint Can Cover

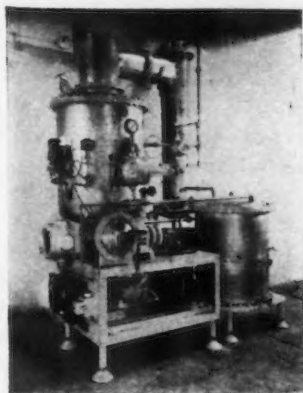
THE Master Mfg. Co., 4715 North Damen Avenue, Chicago, has put on the market the C3 Econ-O-Can



siphon feed cover for friction top cans. The company also manufactures the Hy-Speed Ace model spray gun, which can be used with siphon feed cup, gravity feed bucket or pressure feed material container.

Solvent Still

THE automatic solvent recovery still, developed by the Brighton Copper Works, 2157 Colerain Avenue, Cincinnati, for efficient and speedy reclaiming of used solvents is completely automatic, explosion-proof and built entirely of Monel, according to the company. It features a separate vacuum pump, whose action reduces the boiling point, thus facilitating early distillation. The unit is available in capacities to meet specific requirements.



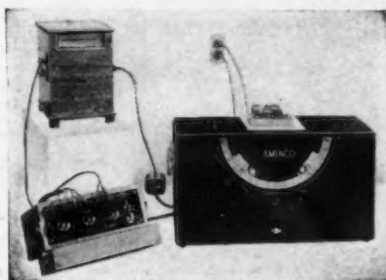
Acid Siphon

FOR discharging acids and chemicals from drums and barrels, the Pulmosan Safety Equipment Corp., 176 Johnson Street, Brooklyn, N. Y., has introduced the Speare's safety siphon with flexible plastic siphon tubing. A simple pumping action of tubing inside casing generates steady flow. It requires no bulbs or auxiliary pumping apparatus, cannot be over-primed or overfilled, and does not build up dangerous pressures, it is claimed. Materials are tested for sulfuric, nitric, hydrochloric and other acids and chemicals.

Gloss Measurer

THE Aminco-Scott Glossmeter, for measuring gloss from zero to 100 per cent of plane surfaces of mate-

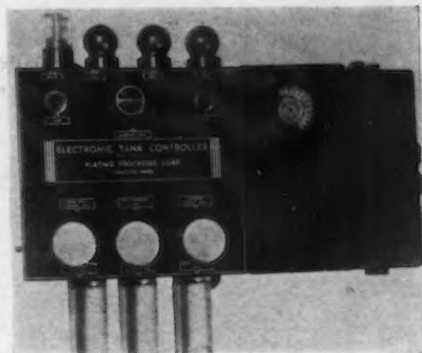
rials over 2½ x 3 in., such as paint finishes, enamels, lacquers, etc., has been put on the market by the American Instrument Co., Silver Spring, Md. Illumination is adjustable from minus 30 to plus 70 deg. from normal. The receptor is adjustable from plus 30 to minus 70 deg. from normal. Angles may be read to 1 min. of arc., and measurements of relative apparent reflectance from zero to 100 per cent (in steps of 0.01 per cent) can be made rapidly. The instrument is said to have sufficient sensitivity and wide range to measure relative apparent reflectance from high to flat



gloss without the use of neutral filters wedges or similar devices. It operates on 110 to 120 volts 60 cycles (controlled frequency) single phase a.c., is unaffected by fluctuations in line voltage and need not be operated in a darkened room.

Tank Controller

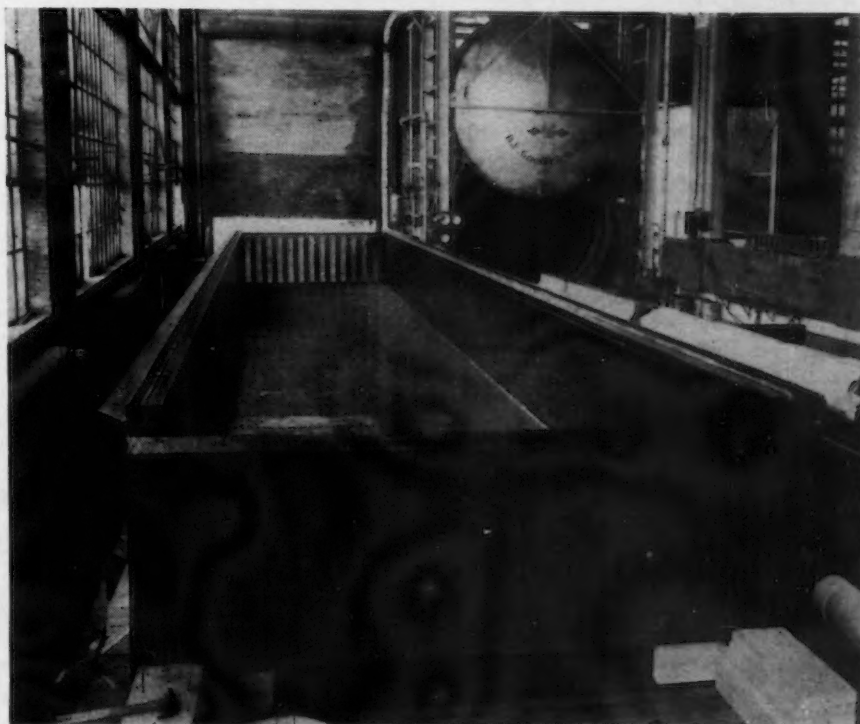
THE automatic tank controller recently placed on the market by Plating Processes Corp., Holyoke, Mass., uses a copper thermostatic



bulb for all types of solutions. Installation includes warning signals both at the tank and in a watchman's station. It is designed to provide automatic starting and stopping,

Tank Lining

A METHOD of bonding solid sheets of Koroseal directly to the welded steel, wood or concrete of tanks is announced by the B. F. Goodrich Co., Akron, Ohio. Koroseal is a plasticized polyvinyl chloride, a synthetic elastic material with many rubber-like properties, which is said to have remarkable corrosion resistance because of the inertness of its compounds to strong corrosives, such as chromic and nitric acids, which have a deteriorating effect on rubber. The company points out that the material has certain limitations both in temperature ranges and effects of various chemicals on it. The new linings, made in sheets, are three times thicker than an earlier type, which employed fabric backing.



Dryer Basket

THE CURRAN CORP., Malden, Mass., announces a patented dunking and dryer basket made entirely from scrap metal. The kit is said to be extremely practical, since it is equipped with a standard 5-gal. steel shipping pail with a removable top containing the company's newly announced Carbon Met substitute for carbon tetrachloride. The part to be cleaned is placed in the dunking bas-



ket which is thrust into volatile Carbon Met. On withdrawal, the spring-like clips attach themselves to the edge of the container, allowing excess solvent to drain back into the pail.

Greaseproof Paper

A PROTECTIVE wrapper called Induwrap for wrapping semi-finished and finished metal parts to protect them against dust, dirt, possible exposure to corrosive media has been put on the market by the *Angier Corp.*, Framingham, Mass. The corrosive inhibitive compound used in treating the metal contacting surface retains any preservative oil or grease picked up from the metallic parts without setting up any harmful chemical reaction. The oil barrier meets the turpentine penetration tests required in government greaseproof specifications and is non-corrosive. It is available in single or two-ply in different widths and sheet sizes. The laminating or bonding agent in the two-ply sheet is also a non-corrosive inhibitive compound.

Noncorrosive Paper

A GREASEPROOF, noncorrosive paper, called V-26, has been announced by *Sherman Paper Products Corp.*, Newton Upper Falls, Mass., to protect highly finished metal parts

against corrosion. Two protective laminations are combined in one paper. The inner ply provides a greaseproof barrier for the retention of corrosion-preventives used on metal products, while a strong outer ply protects the greaseproof membrane against damage in transit. Both inner and outer laminations are non-corrosive, of neutral kraft colored red in accordance with government specifications for Grade A noncorrosive papers. Both are creped for greater flexibility in wrapping. It is available either with an outer film of wax that provides a self-sealing surface, or uncoated where the self-tack quality is not needed.

Small Parts Washer

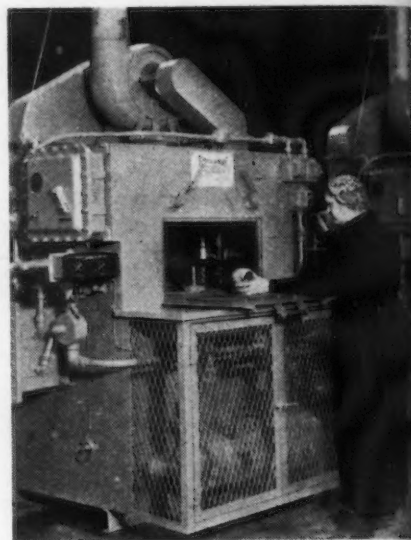
A SMALL parts washer, designed around a special patented endless tumbling belt is a recent development of the *American Foundry Equipment Co.*, 555 South Byrkit Street, Mishawaka, Ind. The unit receives and discharges the parts to be cleaned through a large front opening, and the work is tumbled to expose all surfaces to the cleaning action of the sprays. The open type barrel gives complete access to the parts while in process, and the spray system is also readily accessible. Another layout provides a power wash and a power rinse followed with a compressed air blow-off to remove excess liquid: A special arrangement keeps the two solutions separate and permits washing and rinsing in one compartment without transfer of the parts. To unload the machine, the mill is run in reverse, which will discharge all parts over a chute. Both units are available for heating with steam, gas or electricity, and can be supplied with full automatic controls.

Acid Rust Solvent

NIELCO LAB No. 1923 is an acid rust solvent and metal cleaner for ferrous metals and galvanized sheets which has been developed by *Nielco Laboratories*, 19720 Florence Road, Detroit. The free-flowing powder is readily soluble in cold or warm water and requires no special type of container for shipping. It is used at concentrations varying from 6 to 16 oz. per gal. The metal to be cleaned is immersed in the solution for a period varying from 2 sec. to 10 min., depending on the oxide on the metal. When the product is used cold it requires no specially constructed tanks, but when used hot, wood or lead lined steel tanks are recommended.

Washing Machine

THE Rotospray, manufactured by the *Industrial Washing Machine Corp.*, New Brunswick, N. J., consists of a rotating mesh turntable 2 ft. or larger in diameter, housing, pump, motor and spray system. The parts to be cleaned are placed upon the mesh turntable, the door closed and quick-opening valve turned which allows the cleansing solution to spray



upon the work. As the parts are sprayed a gearhead motor rotates the turntable in order to expose all sides of the work to the spray action which is directed by nozzles from top, sides and bottom. After the work has been cleaned, it can be rinsed with fresh water which passes directly to the sewer. The unit pictured is intended for use with kerosene, hence the explosion proof switches and wiring and built-in CO₂ fire protection system.

Industrial Paints

S. C. Johnson & Son, Inc., Racine, Wis., has developed a new line of paints and enamels as a substitute for their Wax-Fortified line. The mill white flat is designed for either brushing or spraying on industrial wall interiors where a lustreless finish is desired, such as factories, mills, foundries, warehouses, shipyards, etc. The mill white gloss is recommended for places where moisture and humidity are present. The heavy-duty machine enamel can be sprayed or brushed on machinery, power plant equipment, engines, piping, tools, etc., to provide a tough, grease and dirt-resistant finish. The company also offers a primer for painting porous or non-primed surfaces to stop suction; an undercoat and a thinner.

THE GREAT CATASTROPHE OF 1943!



"It was exactly ten o'clock. I know, because I'm sittin' there with my brother-in-law and his wife, and they just got through sayin' it's ten o'clock and they better get home, when suddenly the lights go out. 'That's funny,' I says. 'Yeah, must be something the matter,' my brother-in-law says, 'call 'em up and ast 'em.' So I'm huntin' for the phone, and nearly break my neck when I step on the kid's doll, and then I pick up the phone and there don't nobody answer."

With some such homespun speech as this would many an American commence his version of the Great Catastrophe of 1943 — if by some freak of natural phenomena every electric line in the country should suddenly go dead.

Imagine, if you can, this entire nation without electricity, barely 70 years after the first electric lines appeared. "Brother, I want to tell you that was one hell of a mess," the sidewalk historian would go on to say. And he'd tell how industry, without power for its electric machines, stopped dead. How transportation got tangled, and all communications were out. How food began to spoil, and fuel supplies dwindled, and

cities were without water. And how ignorance and fear fanned the growing national panic as the dread spectres, Crime, Famine and Disease swept over the land.

Preposterous? Certainly. Yet we can think of no more graphic way of illustrating our national dependence today upon the electrical industry. And that entire industry — with its countless products and blessings — was made possible by a relatively few basic precision machine tools!

Jones & Lamson was in at the very birth of the Electrical Age in America, and literally millions of different parts, products and machines have stemmed from machine tools designed and developed by this one company.

In the swiftly changing world of today, such a background as this is of great value to American industry. For it means that Jones & Lamson engineers and service men are among the best qualified machine tool specialists in America to assist your own engineers in meeting changing production problems. Call upon them!



Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread Grinders • Optical Comparators • Automatic Opening Die Heads

JONES & LAMSON

MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.
Profit-producing Machine Tools

Assembly Line . . .

STANLEY H. BRAMS

10,000th medium tank built by Chrysler . . . Cessna Aircraft lists potential buyers of post-war family plane . . . New technique of combining engines revealed by General Motors.



DETROIT — Although some diehards still persist in their belief that the heavy tank is the supreme weapon, the general feeling here in ordnance circles is that the manufacture of tanks, in a declining phase since late last year, has comparatively little chance of returning to its earlier levels.

Although Army opinion is by no means unified on the subject, the majority and increasing viewpoint appears to be that the tank has lost a good deal of its earlier usefulness and can be better replaced by "tank destroyers," units which actually have little more than technical differences from tanks themselves, and by armored cars which involve a rather complete new concept.

Exactly what this trend may mean in the way of industrial production in plants feeding tank makers as well as in the tank plants themselves is a point for conjecture. There already have been announced cutbacks in certain tank programs, cutbacks probably influenced as much, if not more, by the problem of transporting the tanks abroad, than by the decline in the offensive value of the tank.

Several factors figure in the strategic value of the tank. Effectively used by the Germans in their breakthrough of the low countries, tanks succeeded there because they had stuka support and were faced by light

artillery firing high calibre armor piercing shot.

The Allied armies, and probably the Germans too, have obsoleted the dive bomber with low flying aircraft and extremely flexible anti-aircraft gunnery. At the same time, both sides are more and more utilizing movable artillery, such as the German 88 mm. gun.

Movable mounts as utilized in the German 88 mm. comprise the so-called tank destroyer class, of which the American M-7 and M-10 are probably the best known examples. Tank destroyers as a class were conceived as a means of pumping heavier fire power into enemy tanks from mounts possessing enough mobility for hit and run attacks.

HOWEVER, the general history of the past year has been that the tank destroyers gradually acquire heavier armor to afford new crew protection and ultimately wind up nearly as bulky as the tanks they were meant to overpower, thereby losing their advantage of mobility.

In the light of this development, the turn now seems to be toward armored cars. These are rather lightly armored vehicles, wheel or track driven, carrying guns ranging up to 37 mm., and capable of moving as fast as 60 miles per hr. on a straight-away. These are used for scouting expeditions and for enfilading enemy columns, shooting them out of commission and then scurrying back to the base.

On the subject of armored vehicles, it should be mentioned that higher and higher output seems to be the rule on half-tracks. These versatile jobs are used for personnel and cargo transport and for gun carriages. Enlarged output in this class has been the rule and it appears marked to so continue.

Regardless of any change in the strategic value of the tank, the production records made by industry in turning out these machines is history and will not be dimmed by any change in military values. This production job was highlighted last week when the 10,000th medium tank built by Chrysler rolled off the assembly line at the Detroit Tank Arsenal.

AT least one aircraft company is taking steps to assure itself of some post-war business. Cessna Aircraft Co. has listed more than 1000 potential buyers of the "family plane"

it plans to build after the war. And these potential buyers have set aside an average of \$800 each, in war bonds, for the purchase of this plane. The total amount which has been earmarked by these air-conscious Americans for their post-war plane is \$750,000.

The plan worked out by the company, and announced last March, works in this manner. When a person deposits with the aircraft company the serial number of a war bond (it can be as low as a \$25 bond) he is assigned a temporary priority rating. When he increases this listing of war bond serial numbers to \$500 he is assigned a permanent registration or priority number which assures him of preferential treatment when delivery of the company's post-war planes starts.

The plane which these 1000 persons are saving up to buy is described by Cessna as the "family car of the air," one an average person, without experience in flying, will be able to buy, fly and use. While the potential customers have yet to see a model of this plane, they have been assured that it will be stall and spin proof.

Tackling the post-war problem on still another front, one which industry must face during the conversion period, some 82 major cities of the United States are laying concrete plans for municipal post-war projects as an aid to absorbing the labor which will be released from the nation's war plants at the end of hostilities.

In many of these cities, this post-war planning has gone far beyond the committee stage; it has reached the point where projects are being laid out and funds set aside to finance them. These facts were brought to light by a recent survey conducted by the International City Managers Association which showed that out of 92 cities polled, all but 10 are attempting now to chart post-war courses.

This development in after the war thinking is one of unusual importance to industry, for it will supply a large, immediate market for such basic products as steel, cement and other construction materials, in addition to road building equipment, electrical supplies, etc. Most of the plants currently producing these products would require very little if any adjustment to shift their distribution from war to peace time outlets, so that the plan would, to an important extent, provide for some continuity of employ-

More Guns

where
they're needed

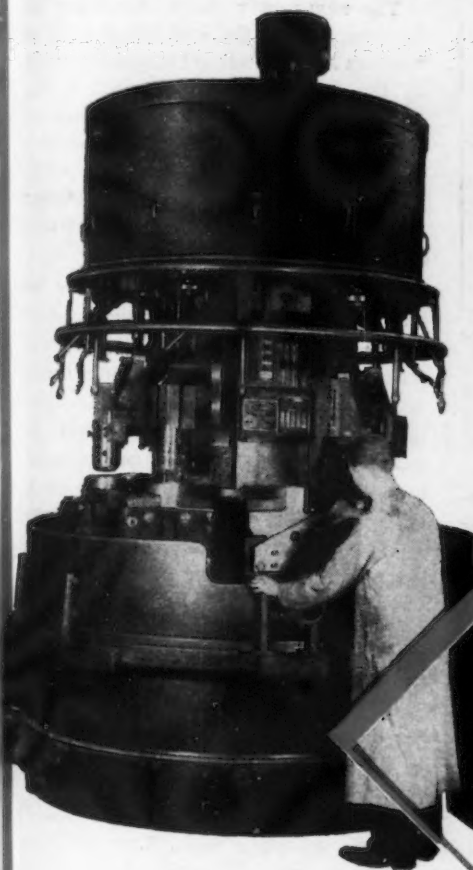


Photo by
U. S. Army Signal Corps

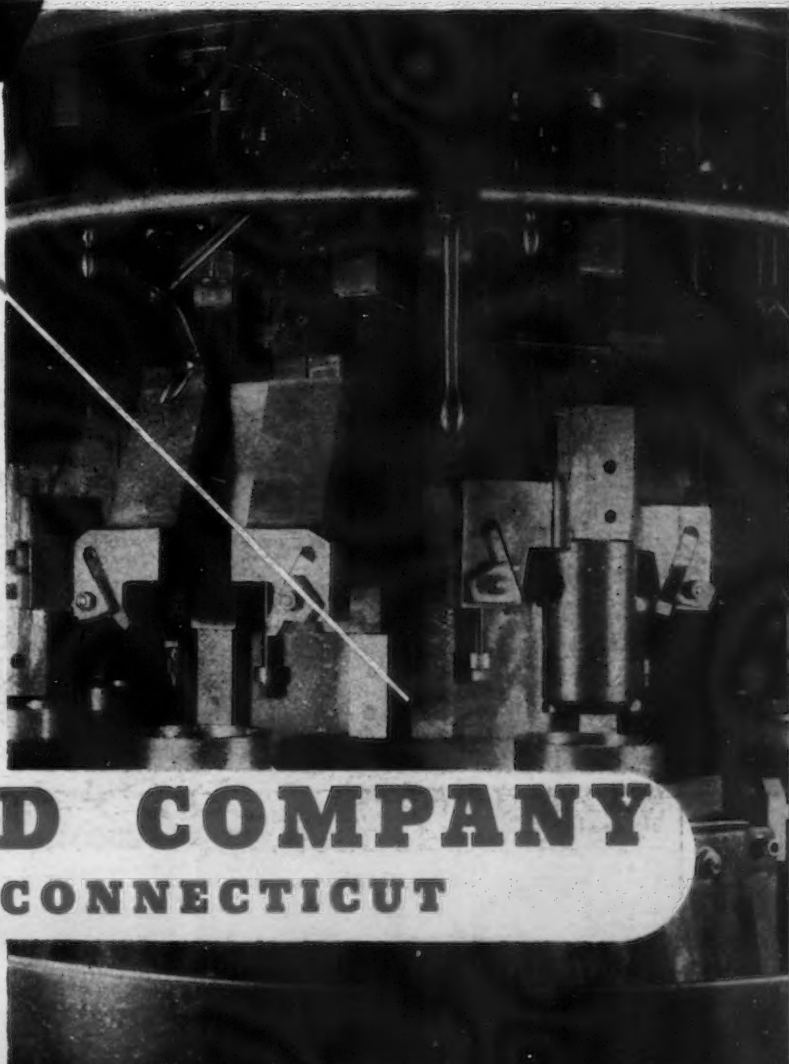
... because of breech rings
made in half the time

• There's no substitute, at the front, for "more guns".

And one of America's plants is now shipping more guns—many more—since they put the breech ring job on 2 Mult-Au-Matics. Now the breech rings are ready for the assembly line in less than half the old time—completely bored, faced, turned, and finished!

Mult-Au-Matic accuracy contributes still further saving of time, by facilitating later operations. Production is constant, with no time out for maintenance or repairs.

Today, Mult-Au-Matic performance is speeding guns, tanks, planes in the numbers we need. Tomorrow, they will be instantly ready to speed your peace-time production.



THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

ment during the reconversion period in many basic industries.

The types of projects being planned are many and varied and include sewer and water lines, new streets and highways, bridges, public markets, air ports, municipal buildings, rehabilitation of distressed areas, etc.

The success of such ambitious projects as these of course rests upon the assumption that funds will be available to finance them. Thus far the financing seems to have been somewhat neglected, although some definite steps have been taken. Schenectady is reported to have established a separate tax for its post-war projects. Other cities are setting aside funds from surplus accounts, some are maintaining present tax rates in face of lowered operating costs. Others are setting up special depreciation and replacement accounts. Detroit's mayor has proposed a special one per cent tax on incomes and profits to be set aside for post-war projects.

While on post-war thoughts, it is interesting to note the number of Detroit plant executives who are readjusting their ideas on the adaptability of their present war production to peace time markets. Many who have held the opinion that their product must be an expensive war time item, wholly unable to fit into commercial competition, have been finding that

Can Opener Permits Reuse of Containers

Washington

• • • Hailed as a conservator of tinplate a new type of can opener which removes tops in such a manner that the cans may be reused is being supplied to Australian Army kitchens, according to trade reports reaching the Department of Commerce. The opener was developed by the Army. Plans have been made for the collection and return of used cans to food processors.

their costs are going down more rapidly than had been expected.

Thus, products which would have been unable to compete in after the war markets on the basis of original cost estimates, are now being produced at costs which will readily permit commercial development. This is apparently true not only in small items, but in large equipment as well. Take the case of the manufacturer of a certain type of engine. The average cost of producing this job, now in mass production, is running at better than \$3500 below original government estimates.

Now that the censors have apparently relented, the Detroit Diesel En-

gine Division of G-M has released a brief description of a new technique of combining engines through which delivery of power to a single propeller is increased four-fold with important savings in weight and space.

The new power plant, in production for several months and being used in various Navy landing barges, is known as the Quad. The basic unit is the Series 71, two-cycle G-M diesel engine. Four of these standard six-cylinder jobs are geared to a common propeller shaft in the Quad in such a manner that the assembly occupies relatively little space.

This arrangement is permitted by the basic design of these diesel units which permits placing the blower, starting motor, generator and other accessories on either side of the engine and rotation of the crankshaft in either direction. This feature permits mounting two pairs of engines on a base in such a way that all four engines are attached to a centrally located gear box.

Paul Cabot Resigns

Washington

• • • Confirming last week's report in THE IRON AGE, Donald Nelson has confirmed the resignation of Paul C. Cabot, director of WPB Salvage Division, effective Sept. 1.

Zipper Production Limited

Washington

• • • With initial allotments available on Aug. 5, WPB has authorized manufacturers to obtain carbon steel from SRC for the limited production of slide fasteners. The order, L-68, as amended, placed specific restrictions on the use of these distress stocks for slide fasteners. Output is to be confined to two-thirds of the average quarterly consumption of all metals by the individual producer during the year ended June 30, 1941.

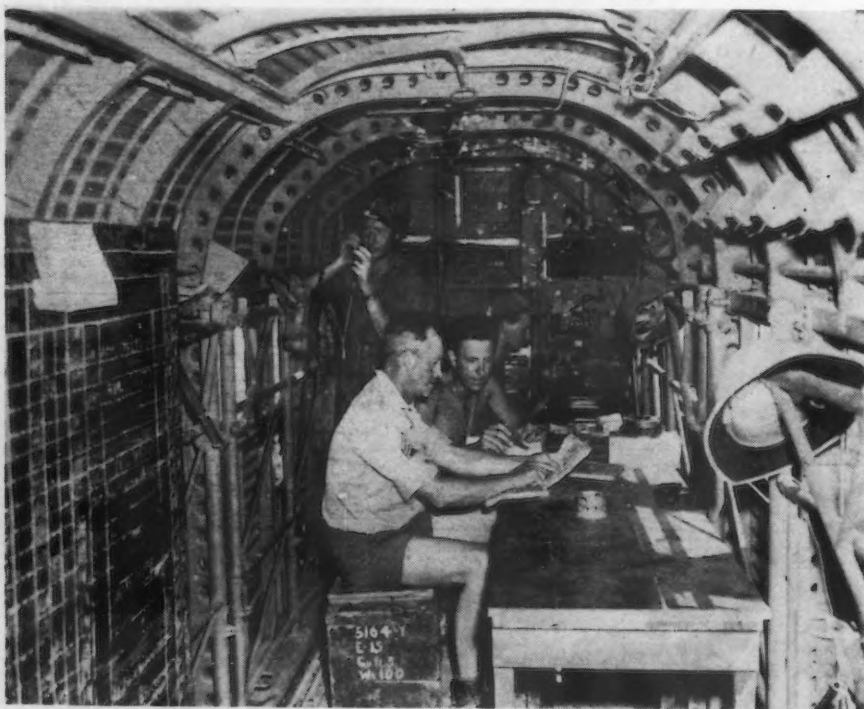
Alloy Uses Defined

Washington

• • • Conservation Order M-21-g has been amended by WPB to clear up technical descriptions of the uses for which certain analysis of alloys are permissible. The order refers to heat-resistant chromium or chromium-nickel alloy iron and alloy steel materials.

CAPTURED TRANSPORT: The interior of a knocked-out German JU 52 serves as headquarters for the men of an advance U.S.A.A.F. base ground crew in North Africa.

Press Association, Inc.



Announcing the Improved **MURCHEY** Collapsible Machine Tap Type "BM"

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MURCHEY

• **Lack of formula governing renegotiation assailed by Rep. Maas . . . Publication of the basis and results of renegotiation urged to prevent favoritism and collusive agreements.**



WASHINGTON—Acting Secretary of War Robert P. Patterson in talking to the Naval Affairs Committee recently told the members of his idea of renegotiation.

Mr. Patterson said: "However on the main point, the price adjustment law strikes me just as though I went into a clothing store and bought a suit of clothes and paid \$60 for it and I found out later that by error an identical suit was selling right in that store for \$40 and the thing just bore the wrong price tag.

"I would go back and say to him 'I want \$20 back,' and he would have to give it back to me. He would say 'Yes, an error was made. I can make a fair profit on that suit at \$40 rather than \$60. It was a mistake of the clerk.'"

This comment came after several witnesses had talked about the Price Adjustment Boards' recapture of excessive profits as a "super-excess profits tax." Mr. Patterson's idea was expressed in another way by Maurice Karker, chairman of the War Department Price Adjustment Board, who declared renegotiation was a "substitute for peacetime competition."

HOWEVER this may be, and despite the fact that many companies told the committee that they had no complaint against any of the price adjustment boards generally, there may be some cases where renegotiation may work out as unfair competition.

Mr. Karker admitted this when he

said that he did not pretend, nor want to be understood as pretending, that there is absolute and uniform equality with every renegotiated agreement. He had been rather closely questioned by Representative Melvin J. Maas, Republican of Minnesota, who proposed that a formula be worked out to insure uniform treatment to all contractors. Government witnesses agreed that such a formula would be desirable but doubted the possibility of working one out which would prove practical for universal application.

It was made clear what factors entered into decisions by officials of the price adjustment boards. K. H. Rocky, Chairman of the Navy Department Price Adjustment Board, set forth the Navy policy. All departmental policies are generally alike but testimony showed that all renegotiation is a matter of judgment which may vary among men of differing disposition and ability.

MR. ROCKY said that the following varying factors govern renegotiation:

"The nature of the contractor's business, its position in the industry and its pre-war volume and profit trends;

"The contractor's financial history, including the growth of its equity, current borrowing, working capital and dividend policy; the ownership of the equity capital and affiliations of directors and officers and, in the case of subsidiaries, intercompany relationships; patent and royalty agreement; the extent of conversion to a wartime basis;

"The contractor's contribution to the war effort, including difficulties and accomplishments in product development and in deliveries, his co-operation with the government and other contractors, the use of his own facilities and funds, and the character and extent of subcontracting; the more significant terms of the contractor's supply contracts and prices and performance compared with those of other similar suppliers;

"The government's contribution to the contractor's operations, including the amount, nature and terms on which facilities and working capital have been provided, technical assistance rendered, and the effect of all these contributions on the contractor's future business;

"The risks incurred by the contractor in connection with the performance of war contracts, such as in-



Press Association, Inc.

CHIEF OF NEW OFFICE: Leo T. Crowley takes over his duties as director of the new Office of Economic Warfare in Washington. The OEW takes over the program of the former Board of Economic Warfare.

creased costs, delays in obtaining materials, rejections and spoilage; the risks of loss arising from the contractor's guarantee of quality and performance of product and from possible termination of the contract prior to completion."

ON this point Representative Maas said that the main complaint that the committee has had is that there is no known formula, even in general terms to the contractor. Manufacturers are left in chaos and uncertainty all of the time. Mr. Karker replied that he did not agree that contractors must know the factors considered in his competitors' cases or the weights allowed to them or what the factors were.

Mr. Karker said: "As a matter of fact you do industry a grave injustice when you don't think that they know among themselves how they have been treated. I assure you that there are industries, notably the airframe industry, that know what happened in



READY-MADE DESIGN FOR TAILOR-MADE REQUIREMENTS

Many machining operations which apparently require special equipment can often be done on standard machines with a minimum of tailoring. Machines of this type offer three big advantages:

1. New design "bugs" have already been eliminated.
2. May be changed back to standard arrangement for general purpose work when original requirement no longer exists; or used as is.
3. Lower first cost.

The illustrations at the bottom show how a precision grinding job was handled with this thought in mind by CINCINNATI Engineers. The part, an aircraft cylinder barrel, requires accurately ground surfaces on the diameter and adjacent face of the flange. To do these operations in the most rapid and accurate manner, both are finished in one setting of the work. This requires the grinding wheel head unit to be set at a 30° angle, so that the wheel would make a line contact with the flange (same as the diameter) and thereby produce the best possible finish. The headstock and footstock were interchanged for the purpose of directing the thrust of the cut against the headstock unit. In addition, the machine is equipped with a standard automatic infeed attachment giving the operator a chance to complete his non-productive chores during the grinding cycle. This set-up assures exceptionally close accuracy and rapid production.

Our engineers will be glad to tell you how the CINCINNATI 10" Plain Hydraulic Grinder can be applied to your center-type work. Meanwhile, a quick appraisal of these machines may be obtained by looking at our insert in Sweets Catalog File. If you would like to have complete data, write to us for specification catalog No. G-490-1.



● Two close-up views of a CINCINNATI 10" Plain Hydraulic Grinder tailored to suit the job... wheel-head set at a 30° angle; headstock and footstock interchanged; automatic infeed attachment.



Washington in the case of one of those companies before the representative of the Air Forces in Santa Monica knew it."

In criticizing the secrecy of the price adjustment boards, Representative Maas said that though he realized the necessity for the renegotiation laws, he thought Congress had never passed a more potentially dangerous law. He bade Mr. Karker to imagine what would happen if the control of the renegotiation law fell into the hands of "crackpots like they have in OPA." He said that the danger of secrecy lies in the threat of discrimination and favoritism ultimately creeping in and that the way to prevent it was to publish the price adjustment board's formula, or the method employed and the results.

"The discrimination would be unquestionably there, Colonel," Mr. Karker returned, "if the representatives of the particular company did not know their facts and were not set down across the table as they are, and had this discussed on a two-way basis in application to their particular company."

"If this were a star-chamber proceeding in which they were allowed to push their facts through a hole in the door and from that same hole

they got, the other way, the sum of money written on a paper, I would thoroughly agree with you."

WHILE Congress is showing disposition to listen to pleas for publication of the basis and results of renegotiation without mention of firm names to prevent discrimination or favoritism, the contentions that a formula is impossible have prevailed.

This argument seems without weight when it is considered that Congress passes tax laws which are designed to fit the complexities of taking profits from all business. Surely it would not be more difficult to make a renegotiation formula, than it would be to make a tax formula.

The statement of considerations put into the record by Mr. Rockey of the Navy contains many so-called standards which lend themselves to the exercise of prejudice and some of them even breed opportunity for freeing malicious political predilections.

For instance, the factor of cooperation with other concerns and the government is weighted in computing profits. What tortured construction could be put on this standard, even conceding, as it is conceded, that motives are well intended. Certainly, there could be a difference of opinion

as to what consists in "the contractor's contribution to the war effort, including difficulties and accomplishments in product development."

The greatest inequity of all is that the signing of a renegotiation agreement bars future court action, according to departmental legal authorities. Why any agreement arrived at under such nebulous and doubtful provisions must be final should be the object of careful Congressional scrutiny. These standards do not furnish the "minimum safeguards to an economy where the normal laws of contracting and supply and demand have been suspended."

Furthermore, though no suggestion of this was made by any committee member, the opportunity for scandalous conduct, and collusive agreements between manufacturers and procurement officers is multiplied by secrecy and the lack of a formula.

United States Steel Declares Lower Income

New York

• • • Income of U. S. Steel Corp. for the second quarter of 1943 before declaration of dividends amounted to \$15,679,456 after allowance for estimated taxes and after quarterly provisions for pensions. Six months' earnings in 1943 were \$31,086,053 contrasted with \$33,866,907 in the first six months of 1942. Shipments of finished steel at 10,040,016 net tons in the first six months of 1943 fell below the 10,503,507 net tons shipped in the first six months of 1942 because of shifting war demands and the effect of the coal strikes. Directors on Tuesday declared a quarterly dividend of \$1.75 per share on the preferred stock payable Aug. 20 to stockholders of record July 30 and a dividend of \$1 per share on the common stock payable Sept. 30 to stockholders of record Aug. 20.

Armco Net Income

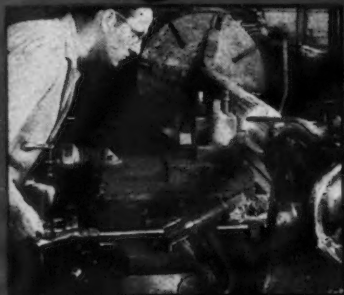
• • • American Rolling Mill Co. earnings for six months ended June 30, were \$3,229,697 after provisions for federal income and excess profits taxes of \$8,219,023 and the addition of \$500,000 to contingent reserves. Payment was authorized of dividends to common shareholders of 20c. per share payable Sept. 15 to stockholders of record Aug. 16, 1943.

THE BULL OF THE WOODS

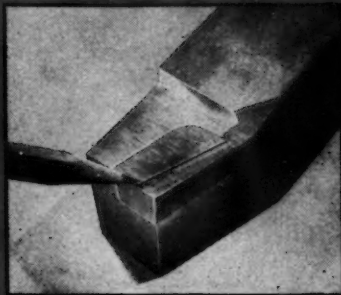
BY J. R. WILLIAMS



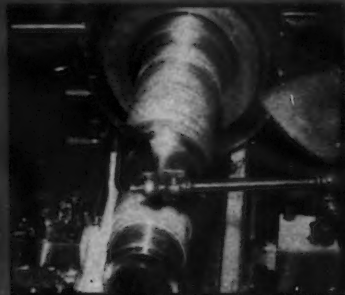
6 STEPS TOWARD TOP PERFORMANCE, WITH CARBIDES, WHEN YOU *CUT STEEL*



CUT AT HIGH SPEEDS—For top performance on the average steel-cutting job, don't cut at speeds less than 300 feet per minute. Slow speeds often cause failure.



USE CORRECT CHIP BREAKER—When you break chips, break them right. Fit breaker to the job. The ground-in step-type shown is usually best.



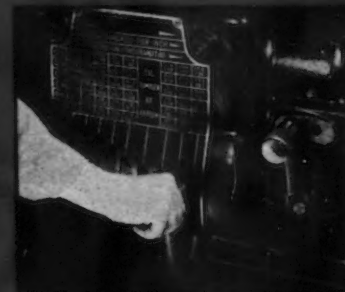
COOLANT—If you use a coolant, provide a heavy, continuous stream, preferably under pressure. If you can't provide ample coolant, it is better to cut dry.



KEEP TOOLS SHARP—Avoid running tools until excessively dull. This causes breakage or drastically shortened tool life. Grind tools at regular intervals for best results.



PROVIDE RIGID SET-UP—Keep tools at absolute minimum overhang necessary to clear work. Chuck part firmly. Rigidity is important with carbides.



FEEDS—For medium and heavy cuts on steel, use feed not less than .010" per revolution, and preferably .015" to .025". Light feeds "rub" tool, causing rapid dulling.

● Important in getting top performance, when cutting steel with carbides, are the six steps shown above. When correctly applied, carbide tools produce results far surpassing the performance of ordinary tools. They operate at machine speeds as high as 4 to 5 times faster than ordinary tools, stay sharp up to 10 times longer, and increase output often as much as 300%.

Important, too, is the carbide you use. When you select from the complete line of carbides produced by Carboloy Company, you get the best type for your particular job—whether it be the popularly designated "titanium carbides", "tantalum carbides", "tungsten carbides"—or "tri-carbide" grades.

Send for catalog GT-142 listing specifications and prices of more than 300 standard Carboloy Cemented Carbide tools and blanks for machining all types of metals and non-metallics.

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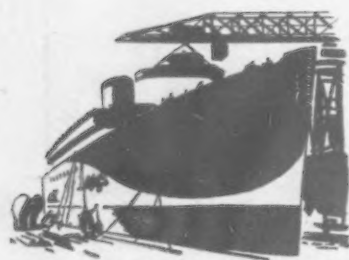
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IS USED FOR
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• Depletion of American mineral resources opens vistas for Pacific import trade . . . Army cancels small Seattle contracts in apparent effort to provide manpower for Boeing . . . Fifty per cent of Boeing shop force now women.



SAN FRANCISCO—Many volumes of slush have been written about the post-war future of the Pacific Coast, many of them revolving around an industrial empire whose principal markets would lie on the western shores of the Pacific. All this is very well and good for light reading, but when subjected to cold, hard, commercial analysis, the whole prospect reeks with ifs, buts, and question marks.

Way back in our college days, we recall sitting in the back of the classroom while the prof explained how and when a market for goods and services was created. All we remember is that he said that a potential customer, to be changed to an actual customer, must have first, the desire to buy, and second, the ability to pay. That's about all we remember, but we don't need much more to enable us to analyze the trans-Pacific market after the war.

There's no doubt that American troops, in the process of liberating the east Asiatic countries, will create plenty of desire to buy. Unless the soldiers and sailors, themselves, settle down to make their homes on the far side of the Pacific, which we doubt many will do, it is difficult to see how a one-sided commercial economy, based solely upon the desire of our friends across the water to buy our goods, could be built up. For years and years, America has had potential markets stretching clear around the globe, in which the people yearned wholeheartedly to purchase American

materials to modernize their homes and factories, and fabricated consumer goods to make their lives more enjoyable. But seldom have they had the wherewithal, either in raw materials or cash, to translate these desires into purchases. America always had its own raw materials, for the most part close at hand, and nowhere along the line in transforming these raw materials into finished products was any help needed. Moreover, the American people have failed to realize the profit involved, as a matter of national business policy, in lending these people money from one pocket so they could buy and pay into the other. Despite the announced desires of our leaders, clarified from Mid-Atlantic, some doubt still exists as to our future ability to pursue such an expensive course.

From a totally different standpoint, which few Pacific trade enthusiasts stop to consider, following the present war our economic position may be changed diametrically from what it ever has been before.

Pessimists have been predicting for years that America's mineral resources are being depleted so rapidly that even technical advances cannot make possible the use of a lower grade material economically to make up for the exhaustion of higher grade reserves. So far, technology has always been a little bit faster than consumption. High transportation costs, devolving principally from long distances involved, have played on the side of utilizing lower grade domestic resources.

Insofar as the far West is concerned—and in non-ferrous metal mining at least the far West wags the country—this war has resulted in the depletion of high grade ore reserves at a rate never before even envisioned.

TWO schools of thought have grown up around the problem of supplying our war mineral needs. One school maintains that, since money is being spent like water anyhow, we should supply our needs by developing the marginal and normally uneconomical mines no matter what the cost. This could be encouraged by means of federal subsidy in one form or another, whether through pegged price, engineering and management assistance, purchase of minerals f.o.b. mine, or by some other subterfuge.

The argument runs that these mines never could stand on their own feet in normal times in competition with the world, and therefore, we are not in a truthful sense depleting our natural resources by exploiting such mines. The few rich ore deposits which remain could then be husbanded for post-war use when cost is an all important factor. These mines could then be fully competitive with foreign deposits. Owners of such mines could be persuaded to hold back on their development by means of judicious tax measures. One of the principal exponents of this school of thought has been Secretary of the Interior Harold Ickes.

A contrary view is held by those who maintain that the country is not strong enough to do anything connected with the war at less than maximum efficiency, including the exploitation of mineral wealth. It is argued that we will have a terrifically close squeak in mining sufficient minerals to support our tremendous war program even by exploiting to the utmost and with all possible speed our richest mineral deposits. It is especially cited that we barely have enough men and equipment to extract our high grade ores, let alone scatter our efforts to thousands of small mineral gopher holes. Our production policy of necessity has emphasized this safer plan of attack, although verbal encouragement has been given to the smaller, marginal mines. Even though we put ourselves out of the mining business after the war, at least we shall be the victors.

Underlying the necessity of following this latter course and the critical nature of our mineral production, the War Department last week announced that 4500 soldiers would be furloughed to work in molybdenum, copper and zinc mines. Last Fall more than 4000 soldiers were furloughed to work in copper, molybdenum, zinc and tungsten mines.

EVEN though the far West may come out of the war with its mines gutted, it still has a chance for a place in the post-war sun. It has been traditionally argued that the superior economic status of the United States is due not alone to its natural resources, but to its efficiency in using them. It is pointed out that China and Russia have natural resources supe-

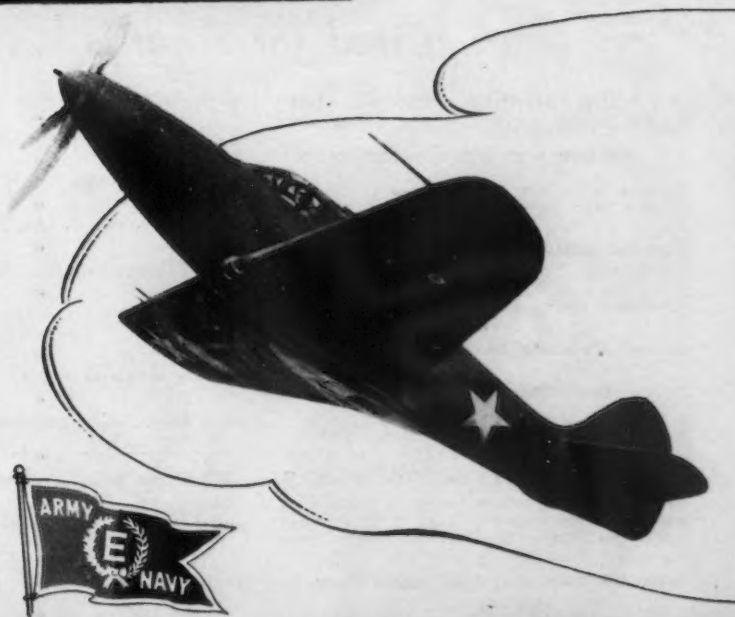
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In a plant of the Bell Aircraft Corp., a Fosdick Economax Hydraulic Radial is pictured drilling holes in a bulk-head forming die. Where planes, ships and other tools of war are being speedily turned out to meet global fighting needs, Fosdick Radials are achieving recognition for efficient performance on such operations as drilling, reaming, boring, tapping, facing, etc. They produce — thanks to such advantageous features as: ease of operation, centralized control, wide range of feeds and speeds, simplicity of tooling up for various operations and different diameter holes. Write for Catalog MI.



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rior to this country, but never have enjoyed our standard of living. If it is true that "know how" is the basis of our success, it may well be that mineral raw materials from across the Pacific can be shipped to America for conversion to finished goods. War has shrunk the vastness of the Pacific, and possibly may reduce ocean transportation costs as well. West Coast ports will certainly be more important than ever as ports of entry for mineral imports; even though ocean transport rates from the Orient to the East Coast are very little more than to the West Coast of America. As the West Coast becomes more important industrially, that little will be enough.

In the steel business, for instance, the small margin of cost of transportation from the Pacific Coast to the Orient was enough to put semi-official representatives of the Chinese government to searching for sources of supply among West Coast mills. Naturally, the independent mills, not having any export ties, would have been in a position to have taken this business had not war broken out involving the United States.

Barring American imperialism, which at the present time is unthinkable,

Just Fire Them Back

••• A machine gun, which uses plastic pellets and compressed air instead of expensive bullets and gunpowder, yet provides all the racket and recoil vibrations of a wartime anti-aircraft weapon, has been developed by engineers of the Edison General Electric Appliance Co. for use in training soldiers at less cost. This gun, operated by electricity, will fire 600 rounds of the plastic bullets per minute. The pellets cost less than one cent each and can be used over.

able, purchase for shipment to the United States of minerals in the Orient will mean at least some money in the pockets of the Orientals, correspondingly improving their status as potential customers for manufactured goods—preferably West Coast manufactured goods.

At any rate, to whatever proportion Pacific Ocean commerce is increased by the necessary importation of ores and concentrates, the West Coast shipbuilding and ship repair in-

dustry will have a better chance of post-war survival. Every little bit along that line will help.

THAT constant bugaboo which haunts the dreams of war matériel contractors has settled down and come to life in the Puget Sound area. First, three manufacturers, working on Army contracts, found cancellation a reality. They were soon joined by three small shipyards. Other small plants have been told to move out of the Puget Sound area or face contract cancellation.

The cause for the industrial quarantine of small manufacturers in the region, according to Joseph Keenan, WPB vice-chairman, is the severe labor shortage at Boeing. Those close to the Seattle situation express strong doubts, however, that labor freed from the smaller manufacturing plants will gravitate to Boeing. A. F. Hardy, area director for War Manpower Commission, has scored the cancellations, pointing out that Boeing wages, by the general aircraft stabilization agreement, have been stabilized below the average for the area.

The cancellations apparently represent the same type of thinking which closed down Western gold mines in the belief that miners would hop right over to the nearest copper mines. Many went to work in war industry, but few went to the copper mines.

A more realistic approach to the situation, which is the same as that followed by the Consolidated plant when the San Diego labor force was fully absorbed, is the farming out of sub-assemblies to smaller plants scattered in nearby towns.

At present, Seattle is estimated to need about 72,000 workers. If all potential women employees in the city would sign up the amount would be cut 25,000. Women employees now account for about 50 per cent of the Boeing shop force compared to three per cent in the early part of 1941.



... Cited for Awards ...

••• The following companies have been awarded the Army-Navy "E" for excellence in war production.

Babcock & Wilcox Co., Augusta Works, Augusta, Ga. (renewal).

National Malleable & Steel Castings Co., Indianapolis Works.

Cincinnati Gear Co., Cincinnati.

General Machinery Co., Spokane, Wash.

J. D. Adams Mfg. Co., Indianapolis.

Aeronca Aircraft Corp., Middletown, Ohio.

Ajax Flexible Coupling Co., Westfield, N. Y.

American Type Founders, Inc., C. H. Cowdrey Machine Works Division, Fitchburg, Mass.

Baker Oil Tools, Inc., Los Angeles Plant.

Bendix Aviation Corp., Julien P. Friez & Sons Division, Towson, Md.

Detroit Harvester Co., Dura Division, Toledo, Ohio.

C. B. Gertry Co., Gilroy, Cal.

Heil Co., Plant I, Milwaukee.

Jackson-Evans Mfg. Co., St. Louis.

Jubilee Mfg. Co., Omaha, Neb.

R. G. LeTourneau, Inc., Toccoa, Ga.

Mengel Co., Fibre Container Branch, Eastern Division, New Brunswick, N. J.

Phoenix Trimming Co., Chicago.

Silas Mason Co., Louisiana Ordnance Plant, Shreveport, La.

Smith, Drum & Co., Philadelphia.

Spicer Mfg. Co., Pottstown Plant, Pottstown, Pa.

Tennessee Copper Co., Ordnance Works, Copperhill, Tenn.

United Electronics Co., Newark, N. J.

MARITIME COMMISSION "M"
Air Reduction Co., Bethlehem, Pa.

Crucible Income for First Half \$3,714,069

New York

••• Net income of Crucible Steel Co. of America for the first six months of the current year was \$3,714,069, equal after preferred dividends to \$6.51 a common share. This was \$132,706 less than the net income for the same period last year which was \$3,846,775 or \$6.81 a common share.

THIS REDESIGN JOB

saves alloys, dries film 500% faster!

A bomber lands at its base after blasting an enemy target. Technicians unload cameras, rush films to the dark room for developing, drying and printing. A short time later intelligence officers know how many more Axis strongholds are out of commission.

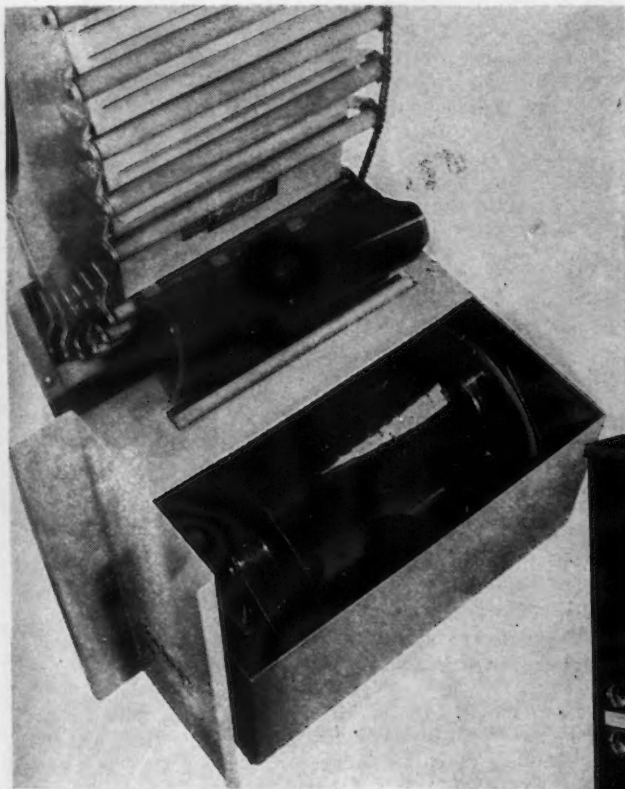
Drying of film, which formerly required three hours, now takes thirty minutes. This fast work is made possible by a new kind of roll-film drier perfected for the Air Corps. Heat, humidity, and even

dust are controlled. A blower spreads 2000 cubic feet of conditioned air a minute over the revolving film. Correct temperatures are maintained by two electric heaters.

Time-saving in the field is only one advantage of this redesigned drier. Critical alloys are saved too. ARMCO ZINCGRIP-PAINTGRIP replaces scarcer metals on all structural parts. Top and sides are painted inside and out to assure long, trouble-free service.

ARMCO ZINCGRIP-PAINTGRIP is a *special-purpose* galvanized sheet that can be formed or drawn without flaking or peeling of the protective zinc coating. Its bonderized PAINTGRIP surface needs no etching to take paint. The PAINTGRIP coating *preserves* paint, keeps it smooth and serviceable longer.

Do these advantages of ARMCO ZINCGRIP-PAINTGRIP suggest ways for you to save critical alloys in your war products—or later for peacetime uses? For complete information just write to The American Rolling Mill Company, 2251 Curtis Street, Middletown, Ohio.



PHOTOS COURTESY THE LAU BLOWER COMPANY



THE AMERICAN ROLLING MILL COMPANY

Fatigue Cracks . . .

BY A. H. DIX

Blue Ribbon for Downeaster

• • • Of the latest crop of advertising slogans, as garnered by Printers' Ink, our favorite is Kennebunkport's "Maine' Idea in Recreation." Worst of a rather mediocre harvest is the Bond Handkerchief Company's "Yours for Victory." We prefer "Yours for a Head Cold?"

Sales Affiliates, Inc., can expect its "The Gremlin Curl Coif" to be moldered in Greenpernt. A Philadelphia brewer's "The Brew for Me in '43," while good, will be outdated almost before the foam has settled, and a Boston financial institution's "The Bank for Me in '43" shows a grave disregard of tempus' invariable habit of fugiting.

Today's sloganeers show a tendency to eschew puns and rhymes and even the balanced line. They are going in for stark statements of fact, as your favorite family journal did years ago when it coined its modest battlecry, "The World's Great Industrial Paper." At the top of the list of those that have placed the simple truth in the saddle, as unadorned as Lady Godiva, is the Barker Food Products Co. with its "The Real Thing in Noodle Soup."

Rivet Census Taker

• • • We make it a point to groan publicly every so often over the volume and variety of inquiries loving readers call upon us to answer. The groans are not, of course, genuine, for in our corner of the Fourth Estate it is well known that the quantity of requests for help is a micrometrically exact measure of a publication's influence in its field.

So bravely we bear our burden, or rather we cheerfully watch the brains department shoulder it, greeting an occasional grumble with something from Kipling about the responsibilities of leadership.

Simple inquiries like "How much steel will be made in 1945?" and "What was the world's corrosion toll bill in '42?" are answered offhand. Toughest of these received in the past several months was "How many rivets in a battleship?" We called up the Brooklyn Navy Yard but the officer who answered the phone was so shocked that we hung up before he could get our name and sic a "G" man on us. We found out somewhere else that about 1½ per cent of a battleship's weight is rivets, and in no time at all we arrived at 1,269,983 rivets, which pleased our inquirer greatly.

That was based on a 30,000-ton battleship. The 45,000-ton Iowa has thrown us off, so if the inquirer sees this will he please raise the rivet count 50 per cent. Or maybe we better make a current check on that 1½ per cent rivet ratio, as a press release has just come in containing this statement by a seaman on the welded Liberty ship "William Moultrie":

On the way to Russia, we were bombed on ten different occasions. A ship carrying explosives was blown right up in our face. The "Moultrie" was literally blown clear out of the water. It hit so hard coming down that it bounced back again . . . Not a quart of water leaked through her seams.

Hits and Misses

• • • The same seaman says, "No direct hits were made on the "Moultrie" but near misses sprayed her with shrapnel." In our language a near miss would be a hit.

Obit Innovation

• • • "By profession he was a prominent architectural designer." So read a recent obit. This idea of hooking up a qualifier with a man's profession has possibilities. "By profession he was a tolerable tool designer"—or "a fair-to-middling metallurgist."

Apronym

• • • The U. S. Maritime Commission's resident auditor at the Pendleton Shipyard Co., New Orleans, is Harry R. Hull.

Potato Duster

• • • Mrs. Ruth Rittman of our Cleveland office chuckles over a letter from the Wabash Valley Land & Cattle Co., Chicago, addressed to THE IRON AGE, asking for prices on "a two-row duster to dust tomato and potato plants." We used to wonder about the streams of farm implement inquiries until we discovered they were intended for the A. B. Farquhar Co., Ltd., York, Pa., manufacturer of a line of garden implements and farm tools under the trade name "Iron Age."

Our Washington office, listed in the telephone directory under the name of our parent company, the Chilton Co., gets telephone calls from people who want their fountain pens repaired.

Secret Service

• • • A Berlin garage owner offered a used car in exchange for 12 copies of an American picture magazine, we learn from a newspaper clipping our v.p. and g.m., C. S. Baur, just passed along to us. The hunger for "outside" periodicals is so great that on the black market prices run as high as 150 marks a copy.

The demand for technical journals is, of course, at fever heat. We had a taste of that when we cabled the U.S.S.R. that paper rationing would necessitate reducing that country's sizeable order. The answering howl hit the four-digit decibel mark.

Whether any copies of THE IRON AGE are leaking into Germany, we have no means of knowing. But as you have observed, the brains department has found a way of giving you the cream of the information published in the German technical press. How this is accomplished is a secret locked behind the high domes of two members of that department.

Mystery Man

• • • When the perfect state arrives, everybody who writes illegibly will be required by law either to "print" or type his name below his signature, to save the millions of man hours now wasted in deciphering smoke screen scrawls.

The mystery at the foot of a single letter is bad enough, even though it wastes the time and raises the choler of only a single recipient. But on the printed page, where it can squander time in mass lots, the undecipherable signature becomes a national menace, like Monday morning hangovers. Take, for instance, this signature in an American Airlines ad:

PRESIDENT, AMERICAN AIRLINES

We can't make it out, and we don't know who heads the American Airlines. Furthermore, we are annoyed at the assumption that we should know who he is despite the disguise. Even though American Airlines is our neighbor, twelve flights up, this is enough to make us travel by stage coach.

Puzzles

Charge this one up to R. E. St. John, Asst. Secretary-Treasurer of Morley-Murphy Co., Green Bay, Wis.:

A steel slab 10 ft. long and weighing 1 ton is placed upon two steel horses. One support is 3 ft. from one end. The other support is 1 ft. from the other end. What is the weight supported by each horse?

Northern SUPER-CRANES

MATERIALS HANDLING
CAN'T BE SUBCONTRACTED

YOU MUST HAVE RELIABLE CRANES

If a lathe, shaper, milling machine or other tool breaks down you may be in serious difficulty. But work can be subcontracted—ways found to meet the emergency.

But if a crane breaks down, the shop it serves is tied up until repairs are made. Materials Handling is one job that can't be subcontracted. You have to have reliable cranes for the heavy load of war production.

NORTHERN USERS HAVE ASSURANCE OF RELIABILITY IN THESE EXCLUSIVE FEATURES:

1. Rigid one-piece welded steel trolley construction.
2. Transmission type single unit, oil tight gear reduction.
3. Easily removable gear case covers. Splash lubrication of gears.
4. Heavy section girders designed for extreme lateral and vertical loads.
5. Heavy duty roller bearings, turned and ground shafts, press fits on gears, wheels, etc.
6. Standard heavy duty anti-friction bearing crane motors—oversize for severe service.
7. Control equipment built by the outstanding specialists in industrial control.
8. Special heavy duty crane wiring construction to insure safety and eliminate wiring troubles.
9. Unit bridge drive mechanism combined with heavy welded steel end trucks.
10. Hoist and bridge brakes designed for extreme loads and hard service.

NORTHERN ENGINEERING WORKS

General Office: 2613 Atwater St., DETROIT, MICH.

NORTHERN CRANE & HOIST WORKS, Limited • WINDSOR, CANADA

Offices at—913 South 38th St., BIRMINGHAM • 53 West Jackson Blvd. CHICAGO • 2428 Spring Grove, CINCINNATI • 5724 Navigation Blvd. HOUSTON • 44 Whitehall St., NEW YORK • 555 Union Trust Bldg., PITTSBURGH • 4135 Gratiot Ave., ST. LOUIS • 1679 University Ave., ST. PAUL

Dear Editor:

SYNTHETIC DISTILLED WATER

Sir:

The "News Front" page of July 8 carried this item, "Water, purified by synthetics, is now being produced equivalent to steam distilled water at a saving of 99 per cent in cost." Where may further information be obtained?

V. E. HILLMAN,
Director of Research
Crompton & Knowles Loom Works,
Worcester, Mass.

● From Permutit Co., 330 W. 42nd St., New York; Illinois Water Treatment Co., Rockford, Ill.; and Resinous Products and Chemical Co., 222 West Washington St., Philadelphia.—Ed.

TEST FOR AIRCRAFT PARTS

Sir:

How many pull tests are required to prove a new heat treating or any new process connected with metals? What are the requirements for both longitudinal and transverse pulls? And what is the number of heat treatments or processings that should be submitted to indicate consistent results?

EDWARD ENGEL,
Chief Engineer
Barn Products Co.,
East Somerset, Martha &
Pennsylvania R.R.,
Philadelphia, Pa.

● Best source of information on this is the American Society for Testing Materials, 260 S. Broad St., Philadelphia.—Ed.

AUTRES TEMPS AUTRES MOEURS

Sir:

I have noted a Roosevelt tendency lately, in your editorials. By that I mean an appeal is being made to a class. Mr. Roosevelt's talks are directed to the masses, or "underprivileged" as he calls them, with socks for the rich and gifts for the poor, always with an eye on the vote that will keep the party in power. It seems to me in your writing to counteract that appeal you lean over backward and miss the few good points advocated by the reformers. You are guilty of the same charge as F.D.R. in saying what you think your readers want to hear rather than dealing with realities. As you know, there has been a social upheaval in the world and we have to face the changed conditions. You cannot wish or write yourself back to the good old days of the nineteen twenties, nor is there any danger of going to the extreme of the communist state if we keep our feet on the ground.

I don't think the platitude "freedom from want" necessarily means a six-hour work day with two chickens in every dinner pail. My interpretation is that no human being with a spark of ambition should ever become so frustrated by poverty, sickness or accident, that he is forced out of the

running or that his heart must be broken because he cannot give his children even the bare necessities of life. Some reforms have to be put in operation to eliminate past abuses. Instead of hitting our heads against the new deal stone wall, let's take their good points and put them in working order and beat them at their own game.

Cincinnati, Ohio

S. O.

FREEDOM FROM WANT

Sir:

I believe that I recall an editorial appearing in your magazine entitled "Freedom From Want." I should like to refer to that editorial, but unfortunately I do not know in what issue it appeared.

L. C. HUMASON
Humason Mfg. Co.,
Forestville, Conn.

● Issue of March 11, 1943.—Ed.

DRESSER, NOT BRADFORD

Sir:

In your June 17 article, "Hot Trimming of Shell Forgings," page 51, reference is made in the last paragraph to development of shell trimming by the Yoder Company in collaboration with the "Bradford Mfg. Co." of Bradford, Pa.

We feel sure that you intended to refer to the Dresser Mfg. Co. of Bradford, Pa.

M. G. BARCLAY,
Coordinator
Dresser Mfg. Co.,
Bradford, Pa.

● We meant Dresser and apologize for the error.—Ed.

WELDING STEEL STRUCTURES

Sir:

Where can we get specifications of the American Welding Society governing shop welding for steel structures?

C. H. BLEIM,
General Manager
Weatherly Steel Co.,
Weatherly, Pa.

● From the Welding Handbook, 1942, published by the American Welding Society, 29 W. 39th St., New York, price \$6 to non-members, \$5 to members.

KRUPP'S CAPACITY

Sir:

Could I obtain from you an article or two in English on Krupp's steel works of Essen, Germany? I am particularly interested in Krupp's capacity in relation to Germany's total output.

J. W. YOUNG
58 Myrtle St.,
West Newton, Mass.

● We have never published anything on this, but understand that Krupp's total steel capacity is about 10 per cent of the country's. Krupp has about 50 per cent of the total alloy steel capacity.—Ed.

"NAMELESS CHILDREN"

Sir:

For a period of more than 40 years, I have been a reader of THE IRON AGE, and I have enjoyed the thought and preparation which lie behind its articles.

Your recent article entitled, "Nameless Children," and devoted to a discussion of the grade labelling projects, which recently appeared in high places in the Government, meets with my whole-hearted approval.

I can think of no more damaging blow that could be dealt the economic system and economic prosperity of America than the adoption of this pernicious device. I have constantly supported brand names and trademarks as a property right and as a valid and reliable guide to the consuming public; and you may rest assured that I shall continue to support these necessary features of our economic life against the encroachments of any such collectivist philosophies as grade labelling represents.

I very much appreciate the intelligence and analytical vision which you have shown in your presentation of this timely article.

JAMES J. DAVIS
Committee on Finance,
United States Senate,
Washington, D. C.

OILDAG

Sir:

In your May 13 issue, "Oildag" was written with a lower case "o" and without quotation marks, even though it happens to be a registered brand of this company. Inasmuch as all other trade marks in the text were properly capitalized or quoted, I assume that the "Oildag" incident was merely a typographical error.

You will be interested to know that the same day that this publicity came to my attention (May 19) we also received a letter from one of the leading metal societies referring to the article and requesting that we immediately furnish them with our shell forging lubrication data. That's what I call "Spitfire" results.

JOHN M. LUPTON,
Director Public Relations
Acheson Colloids Corp.,
Port Huron, Mich.

● Carelessness in proofreading is responsible for the small "o." Hereafter the trade name will appear here as Oildag.

NEWS FRONT INDEX

Sir:

I always find "News Front" of considerable interest, containing as it does items that have not appeared in the press out here or perhaps elsewhere. It would, however, be quite a convenience if such items as appear in greater detail on subsequent pages could be followed by a reference to that page.

J. K. REMSEN
P.O. Box 347,
Grants Pass, Oregon
● The greater part of the News Front items are not mentioned elsewhere in The Iron Age.—Ed.

STEP TURNING...

3 times as fast!

MONARCH PERFORMANCE REPORT

Lathe Size 16 x 48 BB- Automatic Sizing
 Customer Reliance Elect. & Eng. Co.
 Part Name Shaft
 Material S.A.E. 1045
 Heat Treat None
 Operation Turn for grinding- Leave
 .020. Grind Stock
 R. P. M. 420
 Surf. Speed 275
 Feed .015
 Max. Depth of Cut 1/4"
 Type Cutting Tool Carbide tipped
 Actual Cutting Time 3.21 Min.
 Load Time 4.46 Min.
 Approx. Tool Life 55 Min.
 Memorandum Foreman reports
 production 3 times as fast as on
 manually controlled lathes.

Turning the job illustrated is accomplished three times as fast on Monarch lathes equipped with automatic sizing, as was formerly done on standard lathes with manual control. It is typical of what can be accomplished on such work as turning, boring or facing or combinations of these operations. If you are interested in the application of Monarch's automatic sizing, to work in your plant, our engineers will gladly work with you.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY • OHIO

MONARCH LATHES

Save Time

Photograph by courtesy of Reliance Electric & Engineering Co., Cleveland, O.



This Industrial Week . . .

- **New War Schedules, New Equipment Necessary**
- **Planes, Ships, Guns, Vehicles Being Rushed**
- **Forward Buying in Steel on the Increase**
- **Ingot Production Rate Off Half a Point**

TRENDS again are shifting on the wartime industrial front in the United States, spurred by the sensational turn of events in the Mediterranean. United Nations' fighting forces are far ahead of their schedules, making it necessary to telescope and rearrange certain military supply plans and to think in new terms.

Producers of some of the vehicles not so urgently needed recently are under new pressure for deliveries. At least one large bomber plane plant has been switched hastily to make "something more important to the Army." In one area small plants have suffered cancellations in order that workers may be diverted to a plane plant. Emphasis is being placed also upon fast, lightly armored cars for scouting expeditions and enveloping enemy columns.

Every attempt is being made to lift production of aircraft beyond present schedules as rapidly as possible. The success of the air umbrella in the Sicilian campaign appears to be the reason. Efforts are under way to accelerate the designing of new model planes previously proceeding at a more leisurely pace.

At the same time, all indications point to a continuation of the monster shipbuilding program. Despite the success of the Navy in reducing sinkings, the landing of more and more troops and supplies in the various theatres of combat makes more vessels necessary. August directives being received by steel mills show increases in plates and structural items intended for the Maritime Commission, which seems to refute any impression that plate production might be curtailed. Railroad carbuilding requirements also may take more plates than originally expected. The Navy is buying steel pontoons freely and the construction of 1300 oil barges is contemplated. Steel for tank lighters, gasoline cans and scores of other urgent uses is sought.

High-pressure demand upon producers of steel and other metals can be expected to continue. Bookings now are greatly extended, though in healthier shape through the removal of "dead" specifications than at any time since the war began.

The trend to forward buying of steel is such that possibly a check may be attempted by government offi-

Sponge Iron Plant Still Incomplete

Washington

• • • Republic Steel Corp.'s "test sponge iron" plant at Warren, Ohio, is still not complete. The project was approved by WPB last October. At that time WPB said that it was expected that the plant would be in operation "in about four to six months." Moreover, its designer, steel construction engineer Herman J. Brassert, has succeeded in gaining sanction from WPB for expenditure of \$500,000 in addition to the original \$450,000 appropriated. The \$450,000 was supposed to cover the entire cost of the project. On Tuesday it was said that the proposal had been approved by DPC for financing. DPC said the project is to be completed by next January.

cials. One mill estimates that close to 25 per cent of its capacity for first quarter of 1944 has been spoken for.

COAL mine operators are up against a severe manpower shortage following the series of coal strikes because some miners were forced to seek more continuous employment in other industries, or were drafted while the strikes were in progress. Latest reports now show soft coal output still is under normal. Two times in the past week, Solid Fuels Administrator Ickes diverted tonnage to assist hard-pressed steel producers.

Among the dozen odd major unauthorized strikes in the past week affecting the production or services of about 25,000 workers, were walkouts which caused the loss of about 10,000 tons of steel.

The waning of machine tool demand is emphasized in June statistics, which show new orders were down more than 36 per cent from May. This condition likewise was reflected in shipments, which slumped about 32 per cent from May's recorded deliveries of \$114,000,000.

The amount of steel produced for Russia but never shipped out of the United States because other goods were deemed more necessary is estimated in some quarters to be in the vicinity of 600,000 tons. A few weeks ago it was revealed 250,000 tons had been disposed of.

Declining to comment upon last week's charges that WMC has created an "intolerable" situation in the steel industry with its 48-hr. week policies, Chairman Paul McNutt of WMC said on Monday that WMC is not compelled to accept recommendations of the Labor-Management Committee whose management members lodged the complaint. Meanwhile, further study of the

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review statement compiled by the management men revealed a warning issued May 1 by Fred Brenckman of the National Grange and W. R. Ogg of the American Farm Bureau, declaring that the 48-hr. week in steel would create difficulties and should not be approved.

THE Federal Trade Commission's order directing abolition of the multiple basing point system in the cement industry has given rise to speculation whether the commission will renew its attack on the system in steel and other industries. The commission never has been satisfied with the limitations of its twenty-year-old order abolishing Pittsburgh-plus in steel.

Warning last week of "grave consequences" unless greater war production efforts are made by civilians, C. E. Wilson continued the WPB campaign to increase output, which he reported had declined for the past two or three months largely due to strikes and absenteeism. However, WPB continues to collect data on the problem of post-war conversion of war industries. Recently a long report was received on problems of conversion in the auto industry, compiled by a former WPB official. Also, it is known that WPB Chairman Donald M. Nelson is prepared to appoint a strong post-war committee.

In all industrial post-war discussions, the awesome government financial investment in plant facilities is a major consideration. It amounts to about \$25,000,000,000 of which about \$16,000,000,000 was spent by the armed services with their own funds, while \$9,000,000,000 was financed by the Defense Plant Corp. It is the latter which concerns industry most. The DPC owns about 10 per cent of the nation's steel capacity; 92 per cent of magnesium capacity; 50 per cent of machine tool capacity; 90 per cent of aviation facilities and the amount of government-owned aluminum capacity exceeds all private capacity. Jesse Jones asserted last week that he expects a fair deal will be given to industry. Congress, he said, will have the

Drive Nears 650,000-Ton Mark

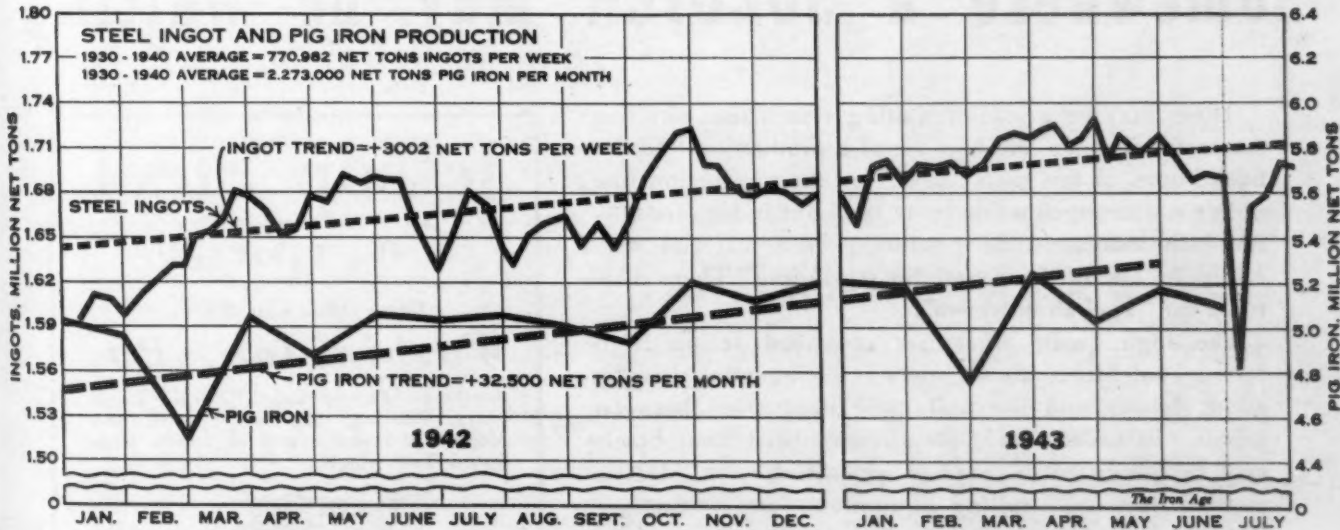
Washington

• • • Steel Division officials figure that approximately 650,000 tons of steel will have been picked up by the "share the steel drive" at its end about a week hence. WPB reported cancellations of more than 525,000 tons, 80 per cent of which were for the third quarter and 20 per cent for the fourth. About 125,000 tons of the total is alloy steel. Partial cancellations by cities follow: Boston, 30,000; New York, 50,000; Philadelphia, 50,000; Atlanta, 38,000; Cleveland, 58,000; Chicago, 86,000; Dallas, 22,000; Kansas City, 21,000; Denver, 17,000; San Francisco, 68,000; Detroit, 25,000.

greatest responsibility for establishing a general post-war industrial policy.

Steel capacity after the war will be less than what it is now officially. There are many plants in operation which are so-called marginal units, and which will be abandoned.

THE ingot rate this week fell half a point to 98 per cent of capacity. Offsetting the gain of two points in the Pittsburgh district to 101 per cent were the declines of one point in Chicago to 98.5 per cent and half a point in Philadelphia to 93 per cent. Birmingham operations dropped four and a half points to 98.5 per cent while in Cincinnati, because of a work stoppage in the billet chipping department of one of district sheet mills, ingot production fell eight points to 95 per cent. In Youngstown ingot output was up two points to 97 per cent while in Wheeling production increased by one point to 88 per cent. Detroit is up half a point to 104 per cent and in the Eastern district steelmaking was better by five and a half points to 111 per cent. Continuing at last week's rate are Cleveland at 100 and St. Louis at 109.5 per cent.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 22	99.0	99.5	95.0	93.5	100.0	106.5	87.0	103.0	103.5*	102.0	103.0	109.5	95.5*	98.5
July 29	101.0	98.5	97.0	93.0	100.0	106.5	88.0	98.5	104.0	102.0	95.0	109.5	111.1	98.0

* Revised



Somewhere a SOLDIER may be waiting

There may be a soldier waiting somewhere—waiting for material that's late because of a production letdown back home. A few tools "down" on the production line didn't matter much a few years ago. But it does today—for each tool must be producing vital material with minimum loss of down time for regrinding. There is no room for "Tool absenteeism".

The high quality that has identified Jessop High Speed Tool Steels for 42 years is saving vital time by giving longer tool life and more production between grinds. In order that Jessop High Speed Tool Steels may be produced in greater quantities, new electric melting furnaces, rolling equipment, and subsidiary facilities have been installed in our mills. We will be glad to consult with you regarding the availability and application of Jessop High Speed Tool Steels to aid you in speeding production.

Jessop Steel Company

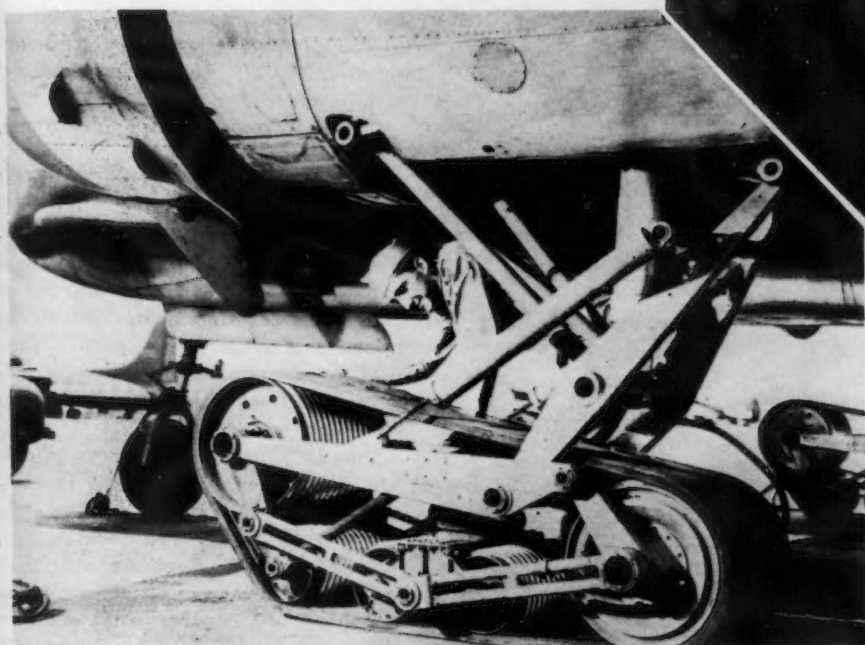
Head Office and Works

Washington, Pa.

Supremus, Purple Label, Purple Label Extra, Mustang, Mustang Special, and Mogul are brand names of Jessop High Speed Tool Steels.



Established 1901



NEW WAR EQUIPMENT:

Upper photo shows 20 mm. cannon installed on P-51 Mustang fighter. At left is new caterpillar landing gear developed by Firestone Tire & Rubber Co., enabling planes to land on rough or soft and sandy ground.

o o o

Vast Investment in Plants Gives Government Great Power, but Jones Predicts a Fair Deal

Washington

• • • Peace-time power to "smother" certain industries, to dominate some, and to have a strong voice in others rests in the government in consequence of its huge financial investment in building new and expanding old facilities for war purposes. The vast extent of this investment is so great that it is difficult to comprehend. It amounts to about \$25,000,000,000. Of this an estimated sum of \$16,000,000,000 was spent by the armed services, with their own funds, while \$9,000,000,000 was financed by the Defense Plant Corp., RFC subsidiary.

It is the \$9,000,000,000 that concerns industry because it was used to build or expand private plants. This is a source of worry to industry, because upon the solution of the problem of post-war disposition of these wide-range facilities revolves the principle of private enterprise as against government control or socialism.

Authority for this broad declaration is based on a radio broadcast by Secretary of Commerce Jesse Jones last week. Mr. Jones, who also heads

RFC, went on record in favor of maintaining the principle of private initiative and private enterprise.

Mr. Jones emphasized the magnitude of the problem of determining a policy with respect to these properties. He declared that he had no fear but that government will deal fairly with industry because he believes the people want to maintain private initiative and private enterprise. He admitted, however, that some will advocate that the government stay in business and operate the facilities with federal funds. Others, he pointed out, may urge that a large part of the expansion be scrapped while still other will be "hoping to buy from the government at sacrifice prices."

Congress, he said, will have the greatest responsibility for establishing a general policy and has created a committee on post-war economic policy and planning under the chairmanship of Senator Walter George, Democrat of Georgia, known as a conservative.

Mr. Jones said that various elements of the executive branch of government, such as the White House, the RFC, Bureau of Foreign and Do-

mestic Commerce, and the WPB are analyzing the problem carefully. Business and industry, he added, under the sponsorship of the Department of Commerce and the Committee for Economic Development, "are dedicated to the maintenance of full employment after the war."

Title to all of the new facilities Mr. Jones discussed is in the United States. Under the terms of DPC contracts, such as those covering steel, machine tools, and other large industrial units, option is given private operators to buy the facilities. But no such option exists with relation to the new aluminum, magnesium, synthetic rubber and pipe line facilities. Hence permanent intrusion of the government in these great fields is a definite prospect unless terms for their purchase are worked out. The plants and facilities built exclusively by the War and Navy Departments stand apart as purely military producers and therefore not as prospective competition with private industry. Moreover, much of their construction will be dismantled. This is especially true with respect to camps, cantonments, shore stations

and airfields as well as many producing plants. Some of the latter, however, may be expected to be kept as standby units. There will, however, be the problem of enormous shipbuilding facilities built by both the Navy and the Maritime Commission. The answer no doubt is that as to shipbuilding and ship operation the Maritime Commission will play a major role in peace as it is doing in war.

As will be seen from the accompanying table, prepared from figures cited by Mr. Jones, the share of government ownership in DPC-financed plants varies widely. It ranges from \$1,000,000,000 or 10 per cent in steel to 100 per cent in synthetic rubber. There is overwhelming Government control in such industries as aviation, aviation gas, magnesium and 50 per cent (probably a conservative figure) in machine tools.

That it is intended to save substantial portions of expanded facilities is indicated by Mr. Jones' declaration that it will be necessary to save every bit of the expansion that can be saved and "use it in rebuilding our economy." Also it is clear that large quantities of supplies—machine tools, for example—will be shipped abroad for, in the words of Mr. Jones, "the rehabilitation of countries that have been over-run by the enemy, and some to replace less modern facilities both in our own country and in other countries."

RFC has built and financed about 1500 plants of various kinds, Mr. Jones said. The large total of 123 given for steel is accounted for by reason of the inclusion of single units and additions such as a blast or open hearth furnace, or a plate mill, rather



Wide World Photos

HELL ON HALFTRACKS: Here is a close-up view of one of Uncle Sam's new anti-aircraft halftracks, destined to become an ache for the Axis.

than integrated plants. Title to all of these rests in the government. The government's 10 per cent ownership in steel, Mr. Jones said, while small as measured against total capacity, will be enough "seriously to affect the industry, because the steel

industry of the entire country has operated over a period of 20 or 25 years at only 60 per cent of capacity. Therefore, the government plants, operated at full capacity, would absorb approximately 20 per cent of the total requirements for steel."

The government, said Mr. Jones, "will be in a position to smother private industry in the manufacture of magnesium and also to dominate the aluminum industry, because government alone will have more than enough capacity to supply the entire peacetime needs for aluminum. These situations will require wisdom and fairness by government, otherwise private investments in these industries would be destroyed."

The \$625,000,000 investment in rubber, Mr. Jones pointed out, is sufficient to manufacture more than 800,000 tons of synthetic rubber annually, "which is one-third more rubber than we have ever used in peacetime." Explaining that the government will own all of this industry, Mr. Jones said that Congress must determine how much of it will be maintained because "we should never again be entirely dependent upon foreign sources for rubber."

In stating that the government will own almost one-half of the country's machine tool manufacturing facilities, Secretary Jones said that "There again, the fate of this industry will, in large measure, depend upon the wisdom and fairness of the government."

Similarly, he referred to the government ownership of 521 plants for the production of aircraft, aircraft engines, parts and accessories, at a total cost of \$2,700,000,000, which is 10 times the value of privately owned investments in the aviation industry. People in this industry, Mr. Jones stated, "are already worrying about what will happen to them when the war is over."

At a cost of \$180,000,000, the government, Mr. Jones said, has built and is building 3800 miles of pipeline.

"Where any industry is able to absorb government facilities in its line, on a basis fair to the government, that policy should be adopted, the government selling or leasing the facilities on fair and reasonable terms," Mr. Jones added. "In those industries where government facilities approximate or far exceed those in private hands, the solutions will be more difficult. For example, we very easily could destroy private investments in the aviation industry, but certainly we should not, and will not."

Distribution of Defense Plant Corp.'s \$9,000,000,000
Investment in Outstanding Industrial Plants

INDUSTRY	Expenditures (000 omitted)	Number of Plants	Annual Capacity (000 omitted)	Percent of Government Ownership
Steel	\$1,000,000	123		10
Aluminum (production)	760,000	9	1,200,000 lb.	Exceeds all private capacity
Aluminum (fabrication)		45	—	
Magnesium	430,000	—	—	92
Rubber	625,000	—	800 tons	100
Machine Tools	—	—	—	50
Aviation	2,700,000	521	—	90
High Octane Aviation Gas	500,000	50	—	40

Bomber Plant Switched to "X" Product

Cleveland

• • • No bombers will be built at the new super-bomber plant under construction in Cleveland for the past year or so. The reason for the cancellation of the contract to build bombers is that the plant will take on an assembly job of "something more important to the Army," reported to be a new type fighter plane.

The Cleveland bomber plant is owned and operated by the Fisher Body division of General Motors Corp.

The change-over from the super-bomber assembly will not take the Fisher plant entirely out of the bomber program, however, as the contract for most of the parts and sub-assembly manufacturing will be retained.

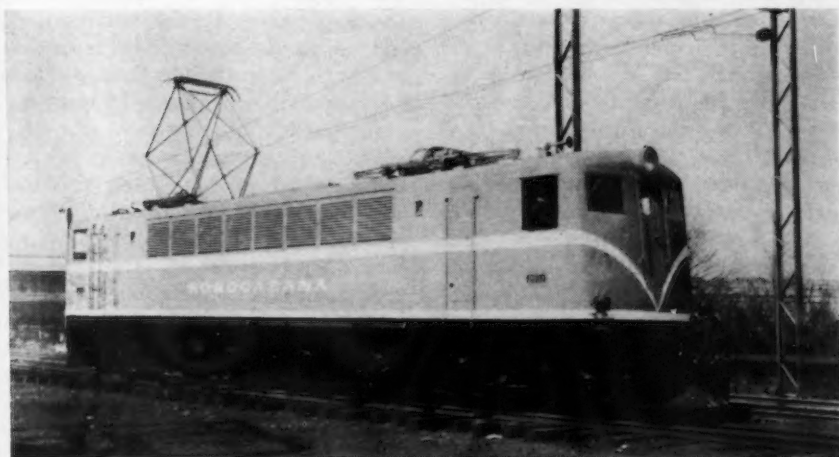
The new job will be a complete unit assembly with fly-away delivery from Cleveland inaugurated. Most of the facts concerning the change-over have been given executive personnel at the plant to set at rest recurring and pyramiding rumors that have been in circulation and to explain why hiring

of new personnel at the plant had been halted.

A. S. & W. Breaks Records

Cleveland

• • • American Steel & Wire Co. has broken more production records during the six-month period ending June 30, than in any like period before in its history. During this time, 431 production records were set in the company's 14 plants. Since Dec. 7, 1941, the date of the Japanese attack on Pearl Harbor, some 1373 production records were established. South Works, Worcester, Mass., with 157 new records in the open hearth, finishing and electric cable departments, leads the list.



Locomotive Schedule to Be Met

Washington

• • • Program scheduling in the heavy steam locomotive specialty manufacturing field, which started July 1, has resulted in assurances from this group that a demand for an unprecedented 200 per cent increase in production in 1944 would be met, the WPB said last week.

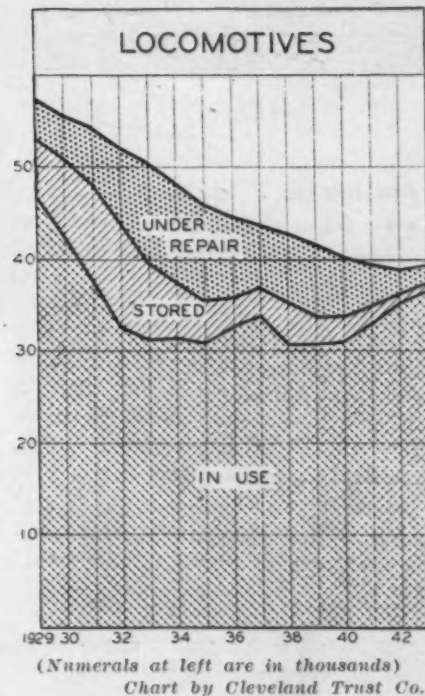
At an Industry Advisory Committee meeting of this group, held recently, C. H. Creaser, Chief of the Motive Power Section of the Transportation Equipment Division of WPB commended the group for having met on time all commitments to the War Department, and 92 per cent of the domestic program.

The Army program for the first six months of 1943 was met in full and 92 per cent of the program for domestic railroads was completed. Delay in producing vital components was given as the reason for not entirely completing the domestic program. Order L-97-d, effective July 1, it is hoped, will correct this situation by scheduling the production of all suppliers of locomotive parts.

A conference of the Locomotive Specialty Manufacturers Advisory Committee was called by C. H. Creaser, Chief of the Motive Power Section of the WPB Transportation and Equipment Division. Mr. Creaser presided at the meeting with the locomotive builders.

o o o

IN THE TOP PICTURE is a new G-E electric passenger and freight locomotive; in the lower picture, nine of the "Austerity" type locomotives produced at the Baldwin Locomotive Works, Philadelphia.



Aluminum



Pittsburgh

• • • When the aluminum expansion program is completed, late this year or early in 1944, the United States will have an aluminum pig capacity of approximately two and one half billion pounds. Since 1939 this would represent a sevenfold gain, which is probably one of the fastest expansion programs of a basic metal yet to be realized, except for magnesium.

About 55 per cent of the aluminum capacity expected early in 1944 will be government owned, but operated on lease by the Aluminum Co. of America. Approximately 36 per cent of the aluminum capacity at that time will be owned and operated by Alcoa. The remaining 9 per cent will be owned and operated by other aluminum companies and part of this will represent government owned capacity operated by private interests. It is believed that the Olin Corp. will operate that portion of the 9 per cent which is owned by the government, while the balance will be owned and operated by Reynolds Metal Co.

Using 1929 as a base index of 100, primary aluminum production in the United States by 1941 had increased 170 per cent. Production figures for 1942 and estimated figures for 1943 and 1944 are unavailable from a censorship standpoint; but it is believed that 1942 production of aluminum was more than 340 per cent greater than 1929 output. Production in 1943 may show an increase of more than 560

Huge Increase in Capacity Places

Industry in Promising Position

per cent above 1929 and in 1944 the increase over that base year probably will run well over 700 per cent. Figures such as these indicate that while aluminum in the postwar period will not replace much steel on a tonnage basis, it will nevertheless be much more highly competitive in certain fields such as alloy steels and stainless.

While it is true that 1944 aluminum capacity will only represent a small percentage when matched against total steel capacity, there have been many items in the past, and there will be more in the future, which may utilize aluminum. Probably the determining factor in this matter will evolve around the price situation. It seems safe to say that with the tremendous capacity of electric steel production, some of which probably will be utilized later for stainless steel, the steel makers will attempt to, and will probably be successful in maintaining, existing price differentials between aluminum shapes and alloy and stainless steel shapes or products. Like most postwar ideas, the "proof of the pudding" will have to come in the postwar era, the conditions of which cannot now be fully known.

The Aluminum Co. of America began improvements and additions to its own plants in September, 1939, and these are practically completed. The government expansion program, or that part of which was designed and built or is building by Alcoa, probably will be completed in full before the end of the year. It is said that some of the difficulty in bringing to completion various parts of the aluminum expansion project have been due to manpower problems. Despite this, the Alcoa and Alcoa-DPC projects have been on schedule.

Basic skilled personnel, necessary to design

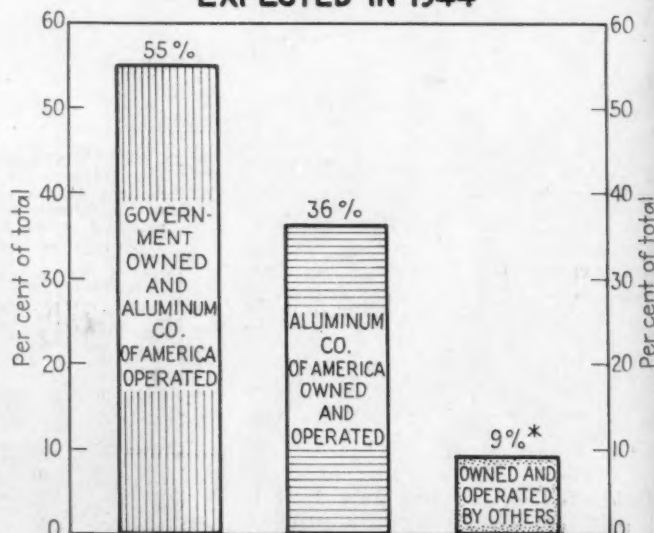
and start the various projects, had to come from Alcoa's existing employees. With aluminum capacity being increased sevenfold from 1939 to 1944 it is obvious that the personnel problems were of a gigantic nature.

Special efforts were made to train new employees by means of extensive training programs. Many difficulties were beyond control of Alcoa, with the result that some operations were delayed. Some of the difficulties involved a much closer cooperation from some unions than had existed before the seriousness of the situation was explained to them. Women employees have been used to the fullest extent; and in certain operations they can be very efficiently used to replace men. As the experience in the employment of women grows in Alcoa, new opportunities are being developed for the employment of additional women. Recently, it is estimated that the Aluminum Co. personnel force was approximately 12 per cent women employees. This participation is expected to increase as more men are drafted, as new jobs become available which can utilize women, and as the expansion program progresses.

The magnitude of the aluminum expansion program can be gaged by the following:

Bauxite mining has been expanded 12 times; aluminum forgings, 45 times; aluminum tubing, 13 times; aluminum castings, 7 times; aluminum wire, rod and bar, 12 times; alu-

DISTRIBUTION OF 2½ BILLION POUNDS OF ALUMINUM CAPACITY EXPECTED IN 1944



* SOME OF THIS CAPACITY IS OWNED BY THE GOVERNMENT AND OPERATED BY OLIN CORP., BALANCE OWNED AND OPERATED BY REYNOLDS METAL CO

minum extruded shapes, 10 times; aluminum sheet, 6½ times. It is said that one of the sheet mills owned by the Aluminum Co. of America is producing, in one month, one and times as much high strength alloy sheet (used in war planes) as the entire nation used in the whole year before the war. Recent estimates show, according to the com- approximately 75 per cent of the average weight of a war plane is made up of various aluminum parts. Aluminum sheet accounts for 48 per cent of the aluminum in a plane; extruded shapes are 13 per cent; wire, rods and bar are 5 per cent; tubing is 3 per cent; forgings are 11 per cent; sand castings, 7 per cent, and miscellaneous, 13 per cent.

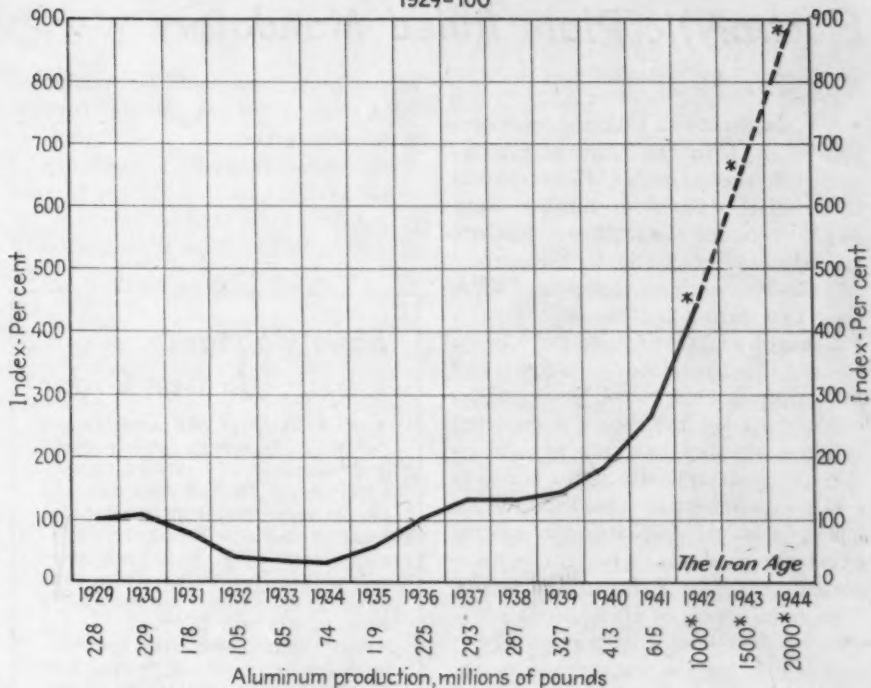
Despite the manpower difficulties, and especially those brought about by long distance recruiting, the entire aluminum question of supply and demand is no longer adversely in the spotlight as was the case a year ago. Efforts are being made to overcome manpower shortages through cooperation of aluminum companies, the United States Employment Service, and the War Manpower Commission.

It seems reasonable to expect that the impact of two and a half billion pounds of aluminum capacity, in a postwar economy, will be substantial when it is considered that the capacity in 1939 was only a little over 325 million pounds.

PRIMARY ALUMINUM PRODUCTION IN UNITED STATES

1929-1943 BUREAU OF MINES

1929=100



NOTE: 1942, 1943, 1944 - Rough estimate

New Magnesium Foundry Adds Capacity

Reflecting the huge war-inspired growth of the magnesium foundry industry, the Magnesium Division of the Howard Foundry Co. here was built and expanded within one year to become one of the largest magnesium jobbing foundries, according to C. C. Misfeldt, consulting engineer for the company. The facilities add about 500,000 lb. per month to the nation's magnesium casting capacity swelling an already formidable national total.

Frank C. Howard, veteran foundryman, converted a part of his aluminum foundry to experimental magnesium casting. These castings lead the way to an Army request for a foundry that could produce 500,000 lb. of cast products per month. Taking over an old iron foundry as the nucleus for the new buildings, the Howard organization built within one year the complete facilities and meanwhile produced about 800,000 lb. of castings during construction.

One casting brought to the foundry by the Air Corps weighs about 50 lb., although it is 60 in. in diameter and 18 in. deep and required approximately 5 tons of sand for the mold. Other unusual castings such as blower cases on one of the largest radial aircraft engines have been pro-

duced successfully during the construction period.

Big plans were necessary to accommodate melting five times the amount of magnesium to be shipped as castings each month. This excess pouring

is due to the large risers and runners and other overage metal that must be poured into each mold to secure a good casting. About 2½ million lb. of magnesium must be handled to secure a monthly quota of 500,000 lb.



New Can Order Poses Difficulties; Electrolytic Plate Ruled Mandatory

New York

• • • Tin problems took the spotlight last week with the joint announcement of the amended Conservation Order M-81 (Cans), a mighty blast by the Justice Department against an "alleged international tin cartel" and the begrudging admission of OPA that two firms had actually filed a Pittsburgh and Gary price for 0.75 lb. electrolytic tin plate—a weight not previously quoted.

The amended M-81 order is expected to cause numberless headaches. Adoption of electrolytic tin plate for several requirements is significant.

The Justice Department, among other charges, was reported to have stated that the Bolivian tin quota (the main source of U. S. tin at present) had not been enlarged this year sufficiently by the controlling cartel while quotas for producing areas in enemy hands had been upped. Other persons contend there is no limit to what any country can produce and that the quota, which is in reality a goal, has not nearly been reached this year by Bolivia.

Complicating an appraisal of the picture is the fact reported in this magazine last week that of 29 detinning plants planned for this country, with the exception of those already completed in New Jersey, Pittsburgh and Chicago and one to be completed in Birmingham, all the rest are to be abandoned.

From the tinplate manufacturers' point of view little difficulty is foreseen except that of furnishing enough tin plate soon enough. Experimentation on various weights of electrolytic coatings have been going on for some time and most companies so equipped are nearly ready to start production. The newer 0.75 lb. coating weight being specified for milk cans and dairy products has presented no particular manufacturing problem for tin plate producers.

No operating difficulties have been experienced by the tinplate manufacturers in producing various weights of coatings once the electrolytic line is functioning properly. On May 6, two manufacturers, believed to be Carnegie-Illinois Steel Corp. and Wheeling Steel Co., filed a price with OPA of \$4.65 per base box with basing points at Pittsburgh and Gary for 0.75 lb. electrolytic. OPA, while not revealing the company names

stated that these could be considered OPA ceiling prices unless further notice was given.

The question of the advisability of using as light as 0.75 lb. tin coating to substitute for 1.25 lb. hot dip for canned milk has been answered vari-

Basic Changes In Can Order

• • • In brief the amendment to M-81 broadens the variety and quotas of canned goods after Sept. 30 and requires the use of more electrolytic tin plate and chemically treated blackplate instead of 1.25 hot dipped plate after that date to consummate a saving of about 6000 tons of tin annually.

Can manufacturers are required after Sept. 30 to use 0.50 lb. electrolytic tinplate or chemically treated blackplate to the greatest extent available; 0.75 lb. tinplate for milk products; Bonderized blackplate exclusively for some new products permitted. Canners are required to use the new specification cans for a minimum of 50 per cent of forthcoming packs. More No. 10 cans are permitted in some cases replacing sole use of 5 gal. containers.

ously. One manufacturer of tinplate stated that tests on 0.75 lb. coatings had shown satisfactory results.

The can companies were the ones most surprised at the sudden rulings

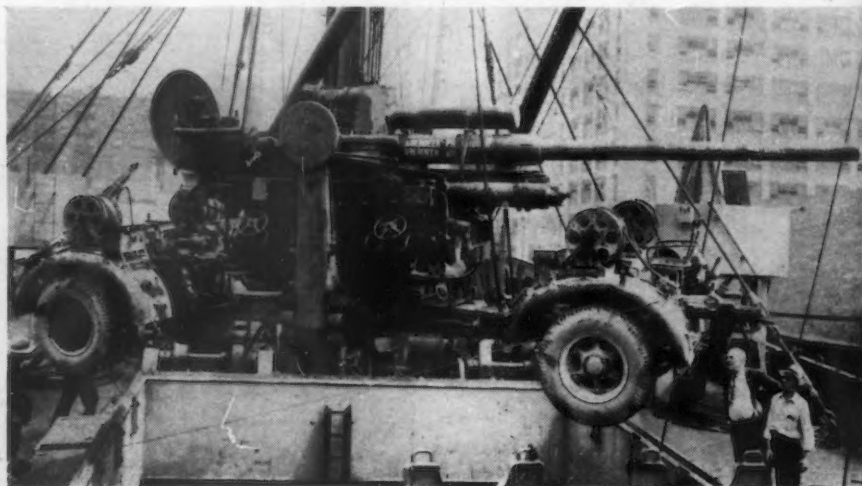
requiring 0.75 lb. electrolytic plate and Bonderized black plate on various cans. Canners asked to observe the new schedule as of Sept. 30 are wondering how this can be done when some can makers don't expect to get delivery of electrolytic plate for about 10 weeks. Can makers also have a delicate task of balancing their inventories of hot dipped and electrolytic so that stock will be available to produce cans to the specifications required by the changeover at the precise time when the packer must observe the rulings to the letter.

The can maker is also confronted with some tough manufacturing problems as a result of the requirement to use 0.75 lb. electrolytic for milk cans. This weight coating in addition to being lighter than usual is also of a different composition than the more familiar hot dipped coating and requires different soldering practice. Experiments have proved the success of soldering can sides by changing to silver-lead solder instead of the tin-lead but due to a different operation used in soldering the ends, a problem not fully solved is presented to the can makers for rapid settlement. One can maker saw so many manufacturing troubles implied by the order that a special meeting of metallurgical and production men was called for this week to resolve some of the problems.

A check of electrolytic tin plate lines this month revealed a total of 18 lines operating, two of these on dull finish, in 11 companies. Four new lines under construction are expected to come into operation in August, one or two more in September and the balance between October and November for a total of 10 new lines.

ENEMY EQUIPMENT: This German anti-aircraft gun, captured in North Africa is bound for the U. S. Army's proving grounds at Aberdeen, Md., where experts will study and test it.

Press Association Inc.



Cancelling Detinning Plants, DPC Winds Up First Large-Scale Program

Cleveland

••• Of the \$12,000,000 detinning plant construction project awarded the H. K. Ferguson Co., Cleveland, by the Defense Plant Corp., during 1942, only work amounting to \$1,750,000 remains to be completed. The uncompleted portion of the project, which involved construction of shredding, cleaning or detinning plants or combination of these facilities in 27 cities ranging from the east to the west coast, has been cancelled by DPC with the exception of one complete shredding, cleaning, and detinning installation at Birmingham, Ala.

The construction of a shredding and cleaning plant with repairs to existing detinning units were completed at the Carteret, N. J., and East Chicago, Ind., plants of Metals & Thermit Corp., and these units are in operation. Work was started but discontinued with the cancellation of the contract at Neville Island, Pa., Long Island City, N. Y., and Chicago, Ill. The Birmingham construction started June 8, and the plant will be completed and in operation by April 1, 1944. The operator of this unit will likely be Johnston & Jennings Co., Cleveland.

With the completion of the Birmingham facilities, there will be seven detinning units in operation throughout the country. These units are:

Metals & Thermit Corp., Carteret, N. J. (existing equipment and additions).
Vulcan Detinning Co., Sewaren, N. J. (existing equipment).
Vulcan Detinning Co., Neville Island, Pa. (existing equipment).
Metals & Thermit Corp., East Chicago, Ind. (existing equipment and additions).
Standard Metal Refining Co., Baltimore (existing equipment).

Johnston & Jennings Co., Cleveland (existing equipment).

Los Angeles By-Products Co., Los Angeles (existing equipment).

Johnston & Jennings Co., Birmingham (complete new plant).

The part of the contract that was cancelled called for plants as follows:

Sewaren, N. J.; Neville Island, Pa.; Baltimore; Philadelphia; Washington, D. C.; Syracuse, N. Y.; Cleveland; Cincinnati; Detroit; Toledo; Boston "A" Plant; Boston "B" Plant; Providence, R. I.; New York; Buffalo; Chicago; Los Angeles; Dallas; Birmingham; Milwaukee; Minneapolis; St. Louis; Worcester-Springfield, Mass.; Hartford-New Haven, Conn.; Atlanta, Ga.; New Orleans.

In cancelling the detinning plant construction program, the DPC wound up completely the first large scale construction program that it has supervised. For the entire project, which was handled by H. K. Ferguson Co., Cleveland, about 90 per cent of the engineering work was completed and about 70 per cent of the required materials and equipment ordered when the project was cancelled. This material and equipment on order represented some 40 per cent of the entire cost of the original project.

Priorities on orders for material and equipment were revoked some time ago by the WPB, and immediate letters of cancellation were sent to contractors and vendors by the Ferguson Co. On work that was partially completed, estimates of costs were submitted by contractors and subcontractors, which were verified by Ferguson engineers and submitted to the DPC for payment. DPC audits reaffirmed the work in process costs for payment. Any work within 30 days of completion was ordered completed, and as much of this equipment

as possible has been sold through DPC to other construction projects throughout the country.

Planned in the face of reduced tin plate coatings on tin cans by the hot dip tinning method and irretrievable coatings applied by the electrolytic tinning process, the project was originally scheduled because of the extremely acute situation on tin supplies. Any recoveries were considered worth the expense.

However, with the successful negotiation of the North African campaign, tin supplies from the Belgian Congo are assured. These, added to stockpiles held by the Metals Reserve Corp., and lesser important supplies from other sources such as Bolivia, apparently have left the country in a much better position on tin stocks. The stockpile of tin accumulated by the MRC, as listed on Oct. 22, 1941, was 66,976 long tons, of which 40,392 tons were in the country and the remainder to be shipped in. Appropriations had also been made for the purchase of an additional supply of 143,108 long tons, and the Chinese government offered 36,000 tons as security for an American loan. How much of this tin was brought into the country prior to Dec. 7, 1941, is problematical, but it is believed a substantial portion was forthcoming.

In addition, the U. S. Government also purchased 24,453 tons of ore and had 253,802 tons on order. This was supplemented by imports of ore from Bolivia, Netherlands East Indies, and South Africa. Both the Pacific and Atlantic wars, however, undoubtedly stopped shipment of much of this material.

On top of these government owned stocks, at the end of 1941 there was an estimated 100,000 tons of tin in the hands of private companies, much of course belonging to steel companies for use in manufacturing tin plate.

However, the requirements of tin at that time were set at 90,000 tons a year. As can be easily calculated, unless tin supplies were steadily forthcoming, the stocks in this country would last only a few years. It was for this reason that the detinning project was inaugurated. The successful invasion of North Africa combined with the cleaning up of the Atlantic of the submarine menace has opened up a steady supply of tin from the Congo, better than was originally expected. This supply is believed to be between 2000 and 3000 tons of tin a month, or some 30 to 40 per cent of the nation's annual tin requirements.

STEEL VS. MUD: In the rain-drenched islands of the South Pacific mud presents a serious problem to transportation and communications. Shown here are steel airplane mats of the Irving Subway Grating Co., being used to extricate a big artillery piece mired in the mud.



Labor Strife Gaining Public Focus; Termed Biggest War Production Factor

New York

• • • A focal point of public opinion is beginning to center on labor—the biggest factor in the success or failure of the war production program. Hot weather, manpower shortage and changing ordinance programs may account for some portion of the slackening noted in production for the month of June but even a quick roundup of labor conditions and disturbances, such as follows, will serve to point out other causes which may go much deeper—labor strife and pressure movements.

Labor, in the form of AFL president William Green and CIO president Philip Murray delivered a price ultimatum to President Roosevelt last week. Said these leaders, either roll-back cost-of-living prices or our organizations will withdraw support of the government's wage stabilization policies.

John L. Lewis won another round in the UMW vs. government coal wage battle by signing the 30,000 member Illinois Coal Operators Association to a new wage agreement granting portal-to-portal pay and a longer work day which would add about \$3 per day to the average miners income without raising the hourly rate—thereby evading the meaning and intent of the "Little Steel" formula.

The WLB has turned down the proposed increases for shipyard workers on the score that the increase would violate the "Little Steel" formula thereby taking a chance on the loyalty of 1,000,000 of America's most vital workers. No strike threat has been made.

A strike of 3000 transit workers had Los Angeles doing gymnastics with trucks, trailers and passenger cars.

Bethlehem Steel Co. at Johnstown, Pa., had 500 men on the night shift of its 27 furnace open hearth plant walkout in a dispute over the firing of one man last week.

An unauthorized walkout of some 800 employees making military truck and passenger tires at General Tire & Rubber Co. in Akron,

Ohio, stopped production and threatened to throw 2600 other workers out of production. One man caused the feud.

The Donora, Pa., plant of American Steel & Wire Co. was blighted by a walkout of 400 open hearth workers which in turn shut down the bar and billet mills adding 250 more to the toll. Steel loss per day for the 12 open hearths is estimated at 2400 tons.

A strike of undisclosed magnitude also halted the Canonsburg Steel & Iron Co., Canonsburg, Pa., last week as a result of a bonus dispute.

Two strikes hit Connersville, Ind., throwing about 1600 war producers out of action at the McQuay-Norris Mfg. Co. and Steel Kitchens Corp. Both strikes concerned wage demands.

Metal pourers numbering about 100 walked out at the Bridgeport, Conn., plant of the Aluminum Co. of America over a question of buying safety gloves. About 1300 per shift were idle.

A work disruption lasting several hours blasted the production of a Ford Motor Co. aircraft engine plant in Detroit in a brief walkout of foremen.

American Magnesium Co., Cleveland, reports a return to work of 60 furnace tenders who enjoyed a three-day strike last week. Full production has been resumed.

A strike of 175 construction workers temporarily halted the construction of an Aluminum Co. of America (DPC) job at Canonsburg last week.

Iron workers at a slab mill of the Carnegie-Illinois Homestead works returned Monday after a three-day walkout protesting installation work being done by AFL electricians.

A wage dispute halted work for nearly two days at the Neville Island Plant of Pittsburgh Screw & Bolt Corp. last week. Work was resumed after Army and Navy officials talked to the union and called for arbitration of the grievances involved.

Production in the 10-in. bar mill at Bethlehem Steel Co.'s Lackawanna plant has been halted for a week (as of July 24) as a result of a wage dispute. This strike action is gravely reducing the plant's output of steel rounds and flat.

A work stoppage in the billet chipping department of one Cincinnati sheet mill caused a reduction in the open hearth production dur-

Anti-Strike Law Strikes

Pittsburgh

• • • Thirty miners, among which were presidents of four United Mine Workers Union locals, were indicted by a grand jury here Monday in the first federal action taken under the Smith-Connally law. Charges included picketing, urging others to stay out of the mines, and threatening harm to returning workers. Twenty-eight were accused of conspiring to cause strikes and picketing.

If found guilty, the defendants may be sentenced to maximum penalties of one year in prison and \$5000 fines. The federal inquiry covered 24 struck mines.

ing the present week and has brought the market average to the year's lowest of about 95 per cent of capacity.

Work stoppages of 60 straightener operators at the local armor plate works of Carnegie-Illinois Steel Corp. last week resulted in delays in the shipment of armor plate. The work stoppages occurred on two consecutive days and lasted from two to three hours each day. The workers presented a grievance request asking for the installation of an incentive pay plan.

Inland Steel Condemns NWLB Union Hiring Ruling

Washington

• • • "Unworkable" was the verdict of Ernest Ballard, attorney for Inland Steel Co. describing the NWLB ruling of last March requiring that Great Lakes ore boat fleet operators hire as high a percentage of CIO National Maritime Union members as were employed either at the close of the last ore season or 30 days after the opening of the present season, whichever was greatest.

Other charges eliciting from company officials stated that the union hiring halls furnished "inferior" men and that non-union crew members were heckled by the union men. Edward Hendrickson, union agent retorted that boat captains "high-pressured" union workers and that non-union watches used "Simon Legree" tactics.

White-Collar Men At C-I Elect USWA

Youngstown, Ohio

• • • White-collared workers of the Carnegie-Illinois Steel Corp., Ohio works in a secret ballot this week voted four to one to have the USWA-CIO act as their collective bargaining agent.

ON U. S. TOUR: Dr. Joaquim Pedro Salgado, Air Minister of Brazil, is greeted by Miss Hilda White, an inspector at the Wright Aeronautical Corp., Paterson, N. J. Looking on, left to right, are Joseph Bapesko, worker in the factory, and P. B. Taylor, vice-president of the company. Dr. Salgado inspected the Wright Whirlwind 9-aircraft engine of the type which will be produced in a new Brazilian factory.



McNutt Avoids Comment on 48-hr. Week Issue; Farm Leaders Opposed the Order

• • • Chairman P. V. McNutt of the War Manpower Commission announced Monday of this week at his press conference in Washington that he will not make a public explanation or be drawn into the controversy surrounding the 48-hr. week in the iron and steel industry. Management members of the WMC Management-Labor Policy Committee were revealed in *THE IRON AGE* last week to have criticized WMC for creating an "intolerable" situation in the industry with its 48-hr. week policies.

McNutt pointed out that the committee is merely an advisory group and WMC is not compelled to accept its recommendations.

Meanwhile, further study of the review statement compiled by the management members reveals an interesting statement issued May 1 by two agricultural members of the Management-Labor Committee. They are Fred Brenckman, representing the National Grange, and W. R. Ogg of the American Farm Bureau. In part they said:

"No adequate showing has been made that there is any manpower emergency existing throughout the steel industry justifying the immediate universal application of such order. Furthermore, it has been generally conceded that the order would have little or no effect at this time to increase the production of steel. It appears, therefore, that the principal reason for rushing this order through at this time is to give the steel workers the benefit of an increase in pay through application of the time and one-half for overtime beyond 40 hr. per week.

"In our judgment, this violates the spirit of the President's 'hold the line' order as this wage increase undoubtedly will add very materially to the increased cost of producing steel, which in turn enters into the cost of production of a wide range of commodities. Furthermore, we fear that this wage increase to the steel workers will encourage other groups to seek similar comparable wage increases and may seriously aggravate the present critical coal crisis. . . .

"We strongly favor the principle of lengthening the work week to whatever limit is necessary to get the production needed for the war, but we do not favor lengthening the work week to provide wage increases

through application of the time and one-half for overtime pay beyond 40 hr. a week and not in excess of 48 hr. a week. Farmers are working 60, 70 and as high as 80 hr. a week without any premium pay for work beyond 40 hr. per week. The men in the armed forces who are risking their lives are not receiving any premium pay for overtime."

Exemptions Eluding 48-hr. Week Restrictions

Pittsburgh

• • • Exemptions to the general 48-hr. week order are being obtained for their non-continuous departments by the major mills in the Pittsburgh district. These permit hiring of unskilled labor in such operations, even though work may be on a less-than-48 hr. basis.

The first step of mills seeking such exemptions is consultation with their unions, and agreement with them or an application. WMC Form 25 is then filed. The local office of WMC has then been speedily approving these exemptions.

Mill operators point out that the rates in their non-continuous operations such as rolling and finishing are entirely contingent on outside factors, like allocations from WPB for the finished steel, and supply of raw metal from blast furnaces and open hearths. These reasons have proved readily acceptable as grounds for exemption from the 48-hr. ruling.

In most instances the steel companies are providing full 48-hour schedules for all their employees, transferring those in departments

working less than 48 hr. to other operations to fill out the time.

Such transferring has been possible because the installation of 48-hr. work-weeks in steel companies has freed practically no one, and the draft has been steadily drawing on manpower.

The State Industrial Board has moved to help alleviate the tight situation in Pittsburgh mills and at other points, by relaxing child labor standards in Pennsylvania. Boys 16 and 17 are now permitted to work in four mill categories previously barred to any under 18—helping on roll tables and roll cars and greasers in rolling mills; working at or near open hearth and blast furnaces; handling ladles containing hot metal; and heating and passing rivets. The only requirement for companies seeking to utilize 16 and 17-year-olds on such jobs is prior approval from the State Labor and Industry Dept.

South Accepts 48-Hr. Week

Birmingham

• • • With the 48-hr. week already approved for a substantial part of Birmingham's steel industry, James A. Downey, Jr., area director of the War Manpower Commission and the U. S. Employment Service, announced here that the rest of the industry would be operating under the wartime work schedule by Aug. 1.

Already on the 48-hr. week, Mr. Downey said, are Sloss-Sheffield Steel & Iron Co.; Woodward Iron Co.; Connors Steel Co., and the tin mill department of the Tennessee Coal, Iron & Railroad Co.

Schedules of other departments of the Tennessee Company and schedules of Republic Steel Corp. are being processed and completed as rapidly as possible, he asserted.

Although the ore mines and by-products plants are not affected by the new order, Mr. Downey said many of them have adopted the 48-hr. week as a matter of necessity in production.

To alleviate a critical shortage of workers in the Alabama coal fields, WMC has suspended recruitment of common labor in this district through Aug. 15. This action was taken after the mining industry's labor-management committee of the Birmingham area recommended to the regional office of the commission that some step be taken to halt the migration of laborers out of Birmingham.

Nature's Welding

• • • Soldiers of the Second Army on maneuvers recently in Tennessee witnessed a neat job of welding. During a storm there was a loud crash and a blinding flash, followed by bellows from a doughboy who had been asleep. Lightning had struck the zipper of his sleeping bag and had run all the way around it, welding him in. He was not harmed.

WPB Issues Critical Materials List

Washington

• • • Dispersing the vague impression that all materials used in war industries are "critical" from the supply standpoint, the WPB has issued a new list consisting of about 500 materials, some of which are critical, while others balance approximately with supply or are slightly ahead of requirements. Conservation of and substitution for the critical materials is expressly asked by WPB in connection with release of the information.

A selected list of some materials most important to the steel and metal working industries, compiled by THE IRON AGE, follows:

Critical Metals

*Most critical

*Bismuth; *cadmium; *tin; *copper; *zinc; aluminum; *tantalum; beryllium; lithium; iridium; osmium; *molybdenum; *nickel; *columbium; tungsten; vanadium; silicon metal; chromium; *chrome-nickel stainless steel; *straight chrome stainless steel; AISI or SAE alloy steel; NE alloy steel; tool steel-high speed; low phosphorus pig iron; alloy cast iron; O. H. carbon steel.

Steel Products

*Bars, 1½ in. and larger; *forgings; *seamless tubing; plates; sheet and strip; bars, under 1½ in. except reinforcing; wire rope; wire products except wire mesh reinforcing; castings; tinplate; terneplate; galvanized sheet.

A large number of items were stated as being in sufficient supply for war uses and essential industry needs. These included: Tools steels, except high speed, pipe, rails, structural, reinforcing steel, a number of ferro-alloys and other materials.

Priority Changes

L-30-d—Amended order permits the production of 10 household articles such as metal pot scourers, flour sieves, and carpet sweepers. Increased production of lunch boxes, baking pans and other specified utensils is also allowed. (7-20-43)

L-68—Amended order permits production of slide fasteners for civilian use to be resumed on a limited scale as a result of WPB action permitting consumption of distress stocks of carbon steel for this purpose. (7-24-43)

L-236—Amendment to Schedule I releases certain fabricated parts, hitherto frozen in inventory by order M-9-c, for use in the manufacture of builders' finishing hardware, cabinet locks and padlocks. (7-22-43)

L-257—Manufacturers of farm machinery and equipment have been authorized to distribute up to 40 per cent of their production (in the year beginning July 1, 1943) of items now listed for rationing under WPB order L-257, which provides for specific quotas for various farm machines and permits unlimited production of repair parts. (7-24-43)

L-265—Amendment 3 provides that used, defective, exhausted or condemned parts for electronic equipment must be disposed of by producer or suppliers, either for salvage or to be destroyed within 60 days.

L-286—Amendment to the order permits dealers to dispose without restriction some fifty types of obsolete and non-standard forms of ammunition now in inventory.

L-301—Amended order limits production of powercycles after July 1, 1943, to those manufactured from fabricated parts in inventory on that date or to those specifically authorized. (7-24-43)

M-34—Amended order permits any laboratory to accept delivery of 5 gal. or less of toluene in the aggregate from all suppliers in any month. (7-23-43)

M-81—Amended order makes available approximately seven million additional cases of canned baby foods, milk products and certain canned fruits for civilian consumption under revised tinplate quotas. (7-19-43)

M-137—Amended order requires manufacturers who use less than 50 gal. of benzene a month to certify to the supplier and WPB that they are not using more than that amount. (7-23-43)

Int. 5 to Reg. 1, Sec. 2 provides that when a rated contract is assigned, the rating remains applicable to the contract as assigned if the assignee uses the material covered by the contract for substantially the same purpose for which the rated contract was placed. (7-24-43)

Reg. 3, Directive 1 and Amendment 1 permits ratings assigned for the third quarter of 1943 only, to government agencies and institutions on Form WPB 837 for maintenance, repair and operating supplies to be used to the extent authorized on the form.

Reg. 13 has been revised to make it more readily understandable. The amended regulation, which controls special sales of industrial materials, makes no substantive change as far as rules and methods of operation are concerned.

Directive 23, as amended, simplifies procedures for review of purchase orders of capital equipment and machine tools by the Army, Navy and other government agencies. (7-19-43)

OCR Class B Products Listed for Steel

Washington

• • • Somewhat confirming the report that OCR would be granted most of a requested 143,000 tons of steel for the fourth quarter, published by THE IRON AGE, July 22, comes an announcement from the CMP Division of WPB outlining specific OCR Class B products which will be permitted for manufacture in the fourth quarter. Presumably a generous grant of steel has spawned this list which is described by WPB as not being a permanent one but one to which additions may be made at any time. Production will be possible starting in October according to the information received.

The list released by WPB, deleted to show only products requiring steel, follows:

OCR Class B Products — 4th Quarter 1943

Ice refrigerators; flashlight cases, portable electric lanterns; lamps, liquid fuel; lamps, portable electric; bedsprings; hospital beds, metal; cutlery; razors; razor blades; silverware, plated; clocks and watches; animal traps and cages; kitchen and household articles; hair pins, bobby pins; pins, common and safety; morticians' goods; musical instruments; office supplies; pens and pencils; umbrellas and parasols; baby carriages, similar equipment; physiotherapy apparatus; X-ray apparatus; surgical and medical instruments, supplies; dental instruments, supplies; ophthalmic goods; slide fasteners, buckles, buttons; tacks and nails; low pressure cast iron heating boilers (other than NHA); radiators, cast iron (no NHA); cooking stoves (no NHA); heating stoves, domestic (excluding electric) (no NHA); warm air registers, etc. (no NHA); warm air furnaces (no NHA); hot water heating equipment (no NHA); screen cloth (no NHA).

may be used to the extent authorized on the form. Use of these ratings is permitted as an exception to the restrictions of Priorities Regulation 3.

ODT Asks Six-Day Freight Acceptance

Washington

• • • The ODT and the Interstate Commerce Commission called on all receivers of freight last week to arrange immediately for full six-day-a-week receipt of carload and less-than-carload shipments.

The appeal was prompted by the current practice of many manufacturing establishments, commercial houses, and stores of refusing to receive freight on Saturdays and restricting the hours for its receipt on

Small Farm Tool Makers Exempt from Schedule OK's

Washington

• • • Small producers of farm equipment, defined as those whose total sales for the calendar year 1941 did not exceed \$100,000, are relieved from having production schedules approved by Amendment 1 to Order L-257, according to a WPB announcement. The definition also includes those classified as small plants by SWPC.

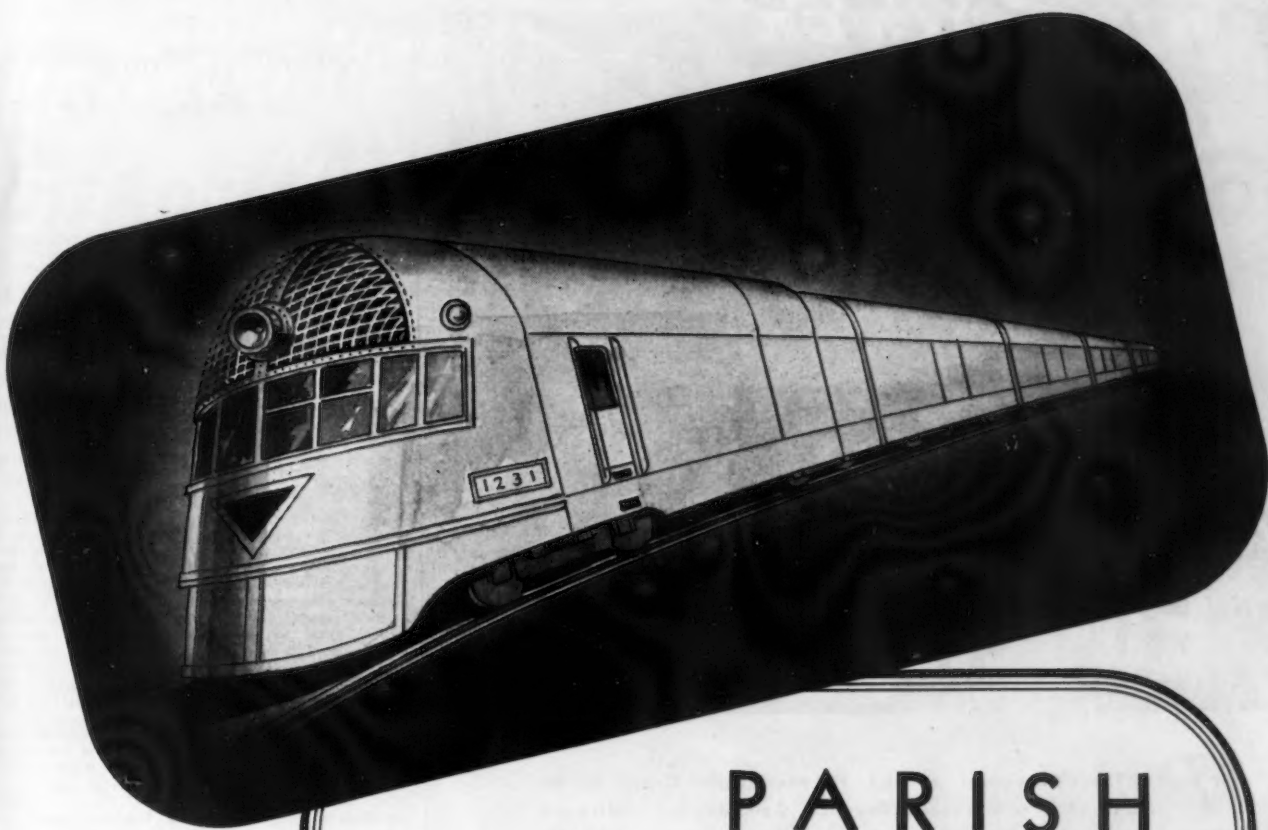
MRO Eased In Reg. 3

• • • Ratings assigned for the third quarter of 1943 only, to governmental agencies and institutions on Form WPB 837 (formerly PD-408) for maintenance, repair and operating supplies

Price Briefs

• Max. Price Reg. 1 has been revised to strengthen and expand price control over second-hand machine tools. (Release No. TCS-534)

• Amendment I to Max. Price Reg. 133 provides that the dealer may add actual transportation costs incurred by him to the suggested retail prices for complete farm equipment.



PARISH STAMPINGS

The railroads of the country have proved themselves miracle workers in the transport of war goods. An equally remarkable accomplishment is heralded for the post-war economy.

Soon to be on the drafting board are designs for rolling stock that will make possible transportation of passengers and freight at the lowest per mile cost ever known.

Steel, as always, will be the basic element in this further advance; for steel, properly alloyed, or properly surface protected, provides resistance to the elements beyond that accomplished by any other material.

Steel also provides resistance to fatigue, to shock, to temperature changes, that is bound to make it the reliance of the future just as it has been of the recent past.

Pressed Metal Parts and stampings will be used by the railroads, and by numerous other industries of the country because of their low cost, their broad range physical characteristics, their aid in the creation of beauty, and for their other well known qualities that has called for the tonnage in the past.

Parish Pressed Steel engineers will be found cooperative and helpful. Why not call on us while your plans are in the preliminary stage.

★
**METAL
STAMPINGS**

★
**MODERN
DESIGN
AT LOW COST**



PARISH PRESSED STEEL CO., Reading, Pa.
Subsidiary of SPICER MFG. CORP.

Western Representative F. Somers Peterson, 57 California St., San Francisco, Cal.





PARTIALLY because of this 15 ton Euclid Crane in the plant of the Maryland Drydock Company of Baltimore, more power in a greater number of vessels moves into the "bridge of ships".

It combines two essentials—speed to meet production schedules and smoothness of control to facilitate assembly operations.

Loads can be raised or lowered as the trolley moves across the bridge while the crane travels speedily lengthwise of the building. The operator has remarkable control in lowering engine crankshafts, cylinders, etc., slowly and safely into position during assembly operations. Greatly appreciated, also, is the auxiliary hoist for more efficient handling of light loads.

Other Euclid features include: liberally proportioned parts throughout, the best type of anti-friction bearings, advanced methods of lubrication and quick, easy facilities for inspection, adjustment or repairs. These features combine to afford a long life of service with remarkable freedom from shut-downs and repairs.

EUCLID CRANE and HOIST CO.

1361 CHARDON RD. • • EUCLID, OHIO



NEWS OF INDUSTRY

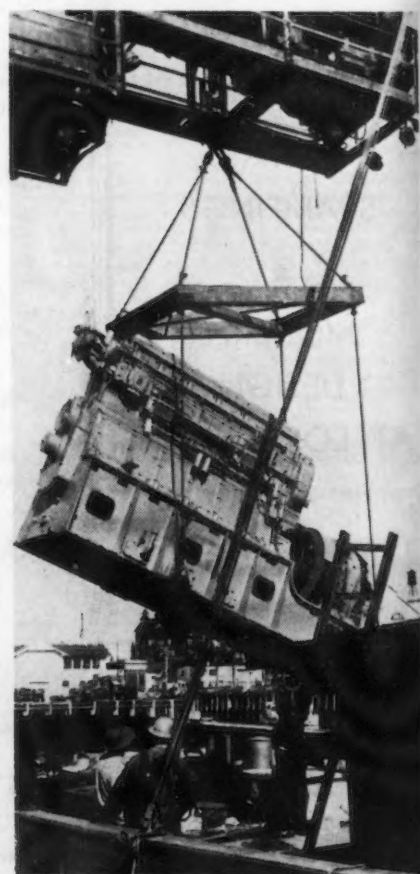
Contractors Warned To Renegotiate Now

Washington

• • • In an order given to renegotiation agencies of the War and Navy Departments, Robert P. Patterson, Undersecretary of War and James V. Forrestal, Undersecretary of the Navy on Monday jointly warned them that they were not to permit contractors to seek to postpone or delay renegotiations in the hope that Congress may amend the Renegotiation Statute. The joint instructions read as follows:

"It is reported that certain contractors are seeking to postpone or delay renegotiation in the hope that Congress may amend the statute to exempt standard commercial articles from renegotiation and to allow deductions of reserves for postwar reconversion. While such amendments and others have been proposed from time to time, the Congress is now in recess and it is obvious that there is no prospect of the passage of any amendments in the near future. The several departments are under the obligation of administering the law and the possibility of amendment does not in any way affect the duty of either the departments or the contractors to continue renegotiation under the existing law. Accordingly, whenever a contractor is delaying renegotiation for this reason, the case should be immediately referred to the Undersecretary of War or Navy for final determination."

DIESEL ENGINE FOR SALVAGE VESSEL: One of four six-cylinder Diesel engines built by Cooper-Bessmer Corp., Mt. Vernon, Ohio, is lowered into place on a "BARS" salvage vessel.



Now
He Never Has to Take His Eyes
Off the Cutter and Work

DEVLIEG JIGMIL



Spindle start, stop and reverse—

Power vertical feed and rapid traverse movement—

Power horizontal feed and rapid traverse movement—

Power automatic table retraction and repositioning—

Power feed and rapid traverse to bar movement—

are all carried in a master switch on the spindle head—at the operator's finger tips.

Thus, the operator of the DeVlieg Jigmil can fix his vision on the cutter and work—never has to look at controls during operation.

The Jigmil is what a machine tool should be—a powerful and accurate extension of the operator's hand. The value in precision boring and milling is apparent.

It's a NEW Type Machine

Spacing Accuracy of a Jig Borer . . . Performance

Qualities of a Milling Machine . . . Convenience and Flexibility of a Horizontal Boring Mill.

New speed of operation . . . New standards of excellence of bored holes . . . New accuracy in milling . . . Automatic table retraction and repositioning dependable within .0002".

Many machines show 75% greater average daily productivity.



DEVLIEG MACHINE COMPANY

450 FAIR AVENUE, FERNDALE (DETROIT), MICHIGAN

Cut-Back War Plants Get New Jobs

Washington

• • • WPB Chairman Donald M. Nelson on Monday announced that war plants whose production programs were "cut back" a few months ago are rapidly taking their places again on the war production battle-line. They are being utilized to break bottlenecks that have periled deliveries of planes and ships on schedule, and

they are being used to turn out the weapons most in demand right now on the fighting fronts, Mr. Nelson explained. And as they go back into full capacity, he said, they are helping to combat the production lag that is threatening to block the achievement of the war production goals of 1943.

Mr. Nelson cited a few examples

of how this division stepped into the breach after the ordnance cut-back and the recent restriction on manufacture of machine tools.

Last November, the R. Hoe Co., New York, was working on a \$12,000,000 contract to make 90 mm. recoil mechanisms at the rate of 500 a month. That was cut to 240 as the supply of those machines outstripped the demand. The Production Resources Division surveyed the plant, found it capable of handling other types of orders in urgent demand. Today, the R. Hoe Co. has more than \$10,000,000 in contracts for badly needed plane parts, engines and Navy gun mounts. It is producing at the rate of \$2,000,000 a month—at full capacity.

Koppers, Inc., Baltimore, hit by the ordnance cut-back, went back into production on maritime contracts for engines amounting to \$18,000,000. With marine engines much in demand, its capacity is tied up until late in 1944.

The Bridgewater Mfg. Co. lost \$1,300,000 in contracts in the cut-back. But WPB found it could make struts for big Army transport planes. Today it has \$1,212,822 in airplane contracts.

Production of more than 100 new, specialized machine tools was avoided recently when the Van Norman Machine Tool Co. of Springfield, Mass., found it could sub-contract gear-blanks for the Perkins Gear & Machine Co., which is making airplane gears for Pratt & Whitney. The capacity was available because of restrictions on machine tools.

Within a few months of the time it got a sharp cut-back on remote control systems for guns, the Dictaphone Co. of Bridgeport was so busy making telescope mountings and taking on sub-contracting that it reported to WPB it could not handle any other major orders.

Cut-back in tank production helped to break a bottleneck in the steel bearings field, which was holding up airplane propeller production. Some of the tank firms affected by the cut-back were found able to make the bearings. Sub-contracting was expanded, two firms were allowed minor expansions, and production was stepped up to meet the needs.

A shortage of valves of all types at one time this spring was holding up production of 300 ships. But at the same time, demand for machine tools was beginning to ease. WPB engineers surveyed the machine tool firms, found enough of them able to handle sub-contracts.

PEAK WAR PRODUCTION demands the Uniformity of LIONITE ABRASIVES

Accurate control of every operation from mining to shipping insures absolute uniformity of LIONITE grains from lot to lot. Converted 100% to war production, we are able to make prompt shipment of LIONITE and CARBONITE grains in all sizes and grades.

GENERAL ABRASIVE CO., INC.

NIAGARA FALLS, N. Y., U. S. A.



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COMPRESSORS "Come Clean"

SOLNUS OILS

End Trouble with Sludge... Double Time Between Changes

Sludge and carbon caused a great deal of trouble with the three compressors in a large ice plant. Results—sluggish operation . . . frequent clean-outs . . . kerosene or gasoline was required to clean compressors properly . . . oil consumption was unreasonably high.

On the advice of a SUN "Doctor of Industry" a switch was made to SOLNUS OILS. At the end of six months' operation a regular inspection revealed that these systems were clean and free from sludge and carbon. The clear film of oil left in the machines was easily wiped off

with a rag, without solvents. In the twelve months since switching to SOLNUS OILS, no trouble has developed and time between oil changes has been doubled.

These savings in time, trouble and expense are typical of those experienced in many cold storage and ice plants through the use of SUN LUBRICANTS as recommended by SUN "Doctors of Industry." Let one of these experienced lubrication engineers help to solve your problems. Write to . . .

SUN OIL COMPANY, Philadelphia

Sun Oil Company, Limited, Toronto, Canada



SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

New Used Tool Price Order Issued

Washington

• • • Major revisions which strengthen and expand price control over second-hand machine tools were announced July 20 by the OPA.

Among the more substantial changes are provisions which affect the rentals of used machine tools, tighten the control over auctioneer's sales and all rental agreements, and reduce the maximum prices for ma-

chine tools which are not rebuilt. These changes are incorporated in MPR 1, effective July 26.

The spread between ceilings for rebuilt and guaranteed machine tools and machine tools which are not rebuilt is widened. The maximum prices for rebuilt machines remain the same but a 5 per cent reduction is effected in the prices that can be charged for machine tools which are not rebuilt.

The price reduction is accomplished by revising the "table of percentages" contained in the regulation. The percentages for "other condition" or "as is" used machine tools are lowered 5 per cent in each age classification. The ceiling price for a machine tool manufactured Jan. 1, 1936, or after is now 70 per cent instead of 75 per cent of the March, 1941, price of the equivalent machine tool when new. The percentages for the three other groups range from 65 to 45 per cent of the March, 1941 price of new equivalent machines.

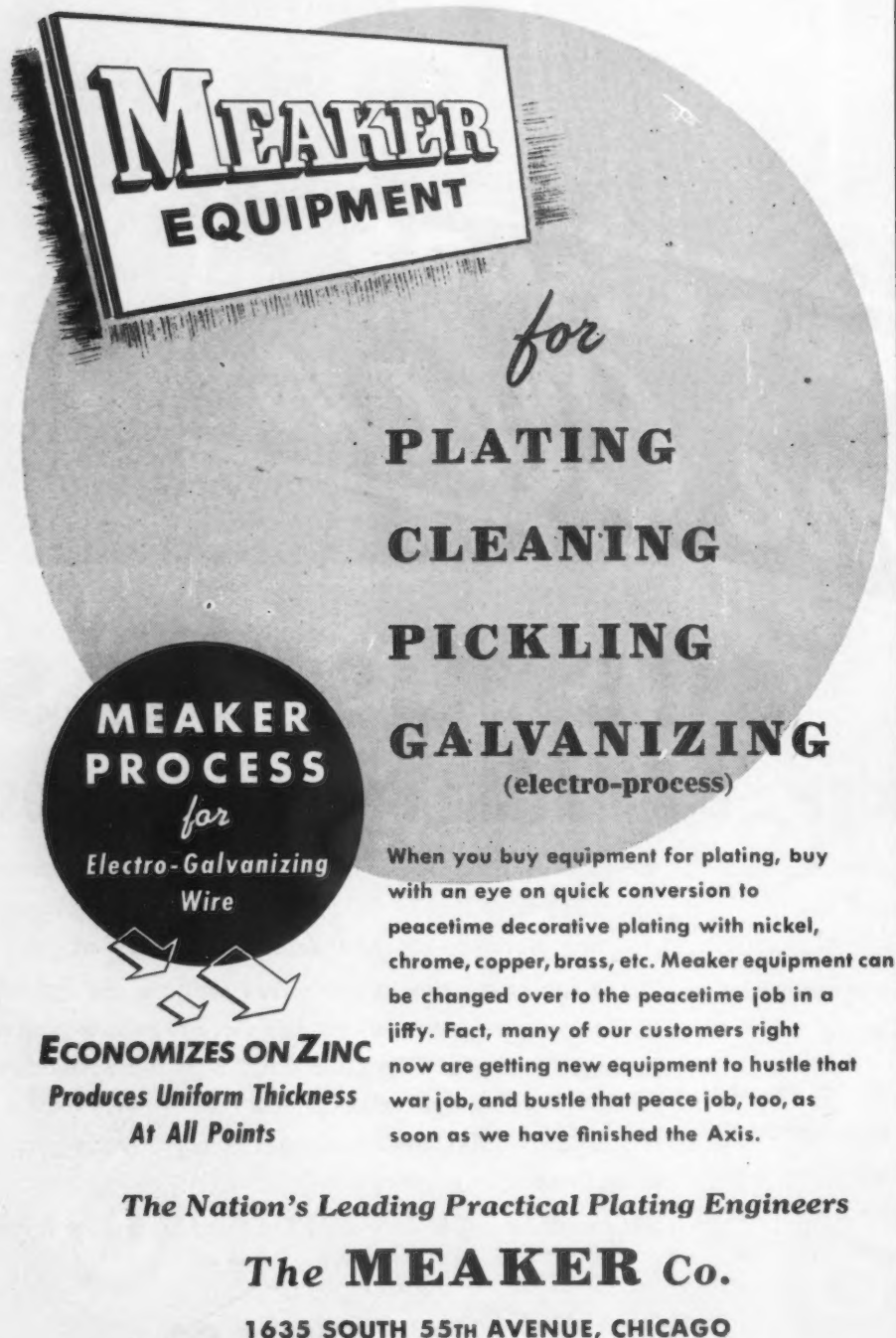
Another move simplifies the determination of the proper "equivalent machine" and its March, 1941, price.

A book of prices of machine tools as of March 1, 1941, is specifically incorporated in the regulation and sets out the correct equivalent machine tools to be used in pricing most of the second-hand machine tools. An equivalent which is specified by the book is to be considered the nearest equivalent new machine tool to the second-hand machine tool to be priced.

A method also is provided for pricing used machine tools manufactured for the first time after March 1, 1941, which brings the base prices of the more recent second-hand tools in line with base prices for others.

"MOLDED AIRPLANES": Whole sections of fuselages, as well as smaller pieces made of built-up plywood, bonded by special resins, come out of pressure cylinders at the Fairchild Aircraft Plant, Burlington, N. C.

Wide World Photos



**MEAKER
EQUIPMENT**

for

**PLATING
CLEANING
PICKLING
GALVANIZING**
(electro-process)

**MEAKER
PROCESS**
for
**Electro-Galvanizing
Wire**

ECONOMIZES ON ZINC
**Produces Uniform Thickness
At All Points**

When you buy equipment for plating, buy with an eye on quick conversion to peacetime decorative plating with nickel, chrome, copper, brass, etc. Meaker equipment can be changed over to the peacetime job in a jiffy. Fact, many of our customers right now are getting new equipment to hustle that war job, and hustle that peace job, too, as soon as we have finished the Axis.

The Nation's Leading Practical Plating Engineers

The MEAKER Co.
1635 SOUTH 55TH AVENUE, CHICAGO



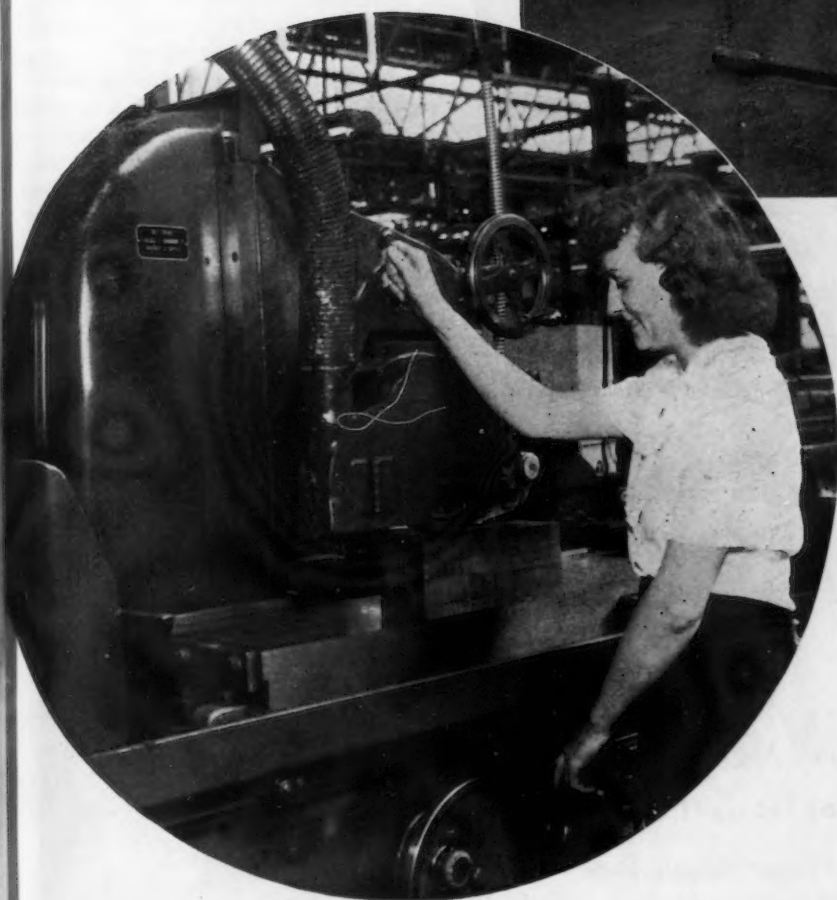
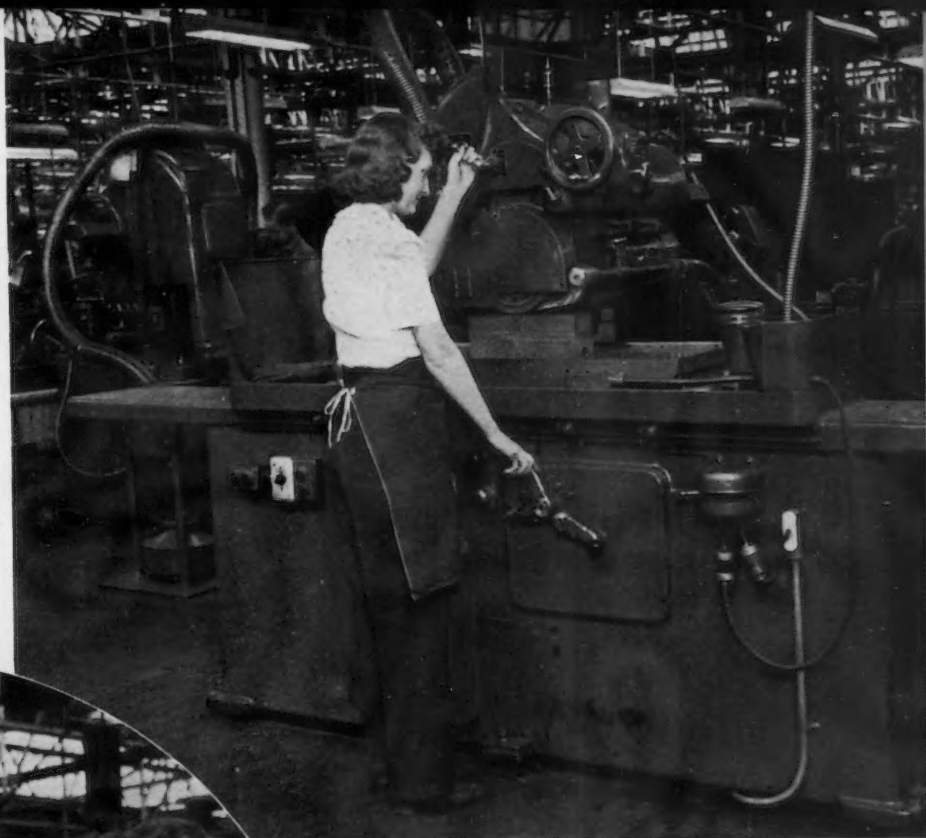
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World Photos



THOMPSON GRINDERS

Women are rapidly filling the vital spots left by loyal men who have joined the various branches of our fighting services.

Thompson Grinders are easy for women to operate. Control of all power operated functions is centralized and hydraulically balanced to move at the slightest touch. Automatic wheel head feeds are standard on all Thompson Grinders. Hydraulic table feed eliminates table shock and results in a clean, smooth finished grind.

If you are faced with a man shortage problem do not hesitate to put a Thompson Grinder in the hands of a woman operator. The ease and simplicity of handling this modern surface grinder enables women operators to become efficient quickly.

THOMPSON BUILDS

a full line of hydraulic surface grinding machines from the small tool room grinder 6" x 18" to the larger C types 36" x 220".

THE **Thompson** GRINDER CO.
SPRINGFIELD, OHIO

Aircraft Unit to Help Place Non-Ferrous Orders for Aircrafters

Dayton, Ohio

••• A new program to assist aircraft manufacturers in placing brass and copper orders has been established by Aircraft Scheduling Unit with the cooperation of the brass and copper mills.

The new program will be handled by the Non-Ferrous Sub-Unit under

Major M. C. Durbin, acting for the Aircraft Scheduling Unit. The Non-Ferrous Sub-Unit is a part of Lt. Colonel A.E.R. Peterka's Materials Distribution Branch, Resources Control Section, Materiel Command, with offices at Steele High Building, Dayton, Ohio.

Under present regulations, brass and copper mills will not accept orders

from aircraft manufacturers when the mill capacity is filled, even though the order is covered with a CMP allotment number. Normally, the manufacturer would then be forced to check all the remaining mills in an attempt to place his order, thus losing valuable time.

To avoid this, the mills voluntarily offered to supply the Non-Ferrous Sub-Unit with weekly reports listing their open capacities. Any manufacturer, therefore, who is unable to place his order should immediately contact the Non-Ferrous Sub-Unit, giving complete information on the order to be placed.

This may be done by letter, telephone, or wire. It is NOT NECESSARY to fill out any forms or questionnaires. In order to provide direct control and immediate action, this program will be handled directly by the Non-Ferrous Sub-Unit. Upon receipt of the proper information, the Non-Ferrous Sub-Unit will then check the list of open capacities and place the order verbally with the mill on behalf of the manufacturer. The manufacturer will then confirm the action with a purchase order.

A New Booklet on
ABRASIVE DISCS and WHEELS
that will answer
YOUR Disc
Grinding Problems!



If - you operate one or more Disc Grinders

If - you are responsible for production from this type of flat surfacing equipment —

this NEW Gardner Booklet is FOR YOU!

Efficient operation of your Disc Grinders depends upon the cutting members you use —
This NEW 20-page Booklet covers many types of Modern Abrasive Discs and Wheels!

GARDNER - GRIND
 YOUR Flat SURFACES

GARDNER MACHINE COMPANY

412 East Gardner Street • • • Beloit, Wisconsin, U.S.A.

Send Now
 for this
**NEW
 BOOKLET**

GARDNER MACHINE CO., NAME _____
 412 E. Gardner Street TITLE _____
 Beloit, Wisconsin COMPANY _____
 Please send, without obligation, a copy of your Booklet "GARDNER ABRASIVE PRODUCTS". STREET _____
 CITY _____ STATE _____

DEFENSE POWER OF FORTRESSES: Carried on a flying fortress is an accurate gun sighting instrument, the Sperry computing sight, which enables a gunner to get a "bull's-eye" every time.





A Widely Known Name Backed by a World of Experience

All Bohn plants are operating at full capacity on war work. Bohn engineers, metallurgists and research staffs are gaining new and rich experiences which are proving of great importance to our vital war production. Bohn has developed new and better methods of producing various aluminum, magnesium and brass products as well as aircraft-type bearings. All of these Bohn products are known throughout the world for their high quality and many economic advantages.

So we want you to become better acquainted with the name BOHN and the products that bear this well known mark of distinction.

Maybe sometime in the future, Bohn can make a part or a product for you and make it better, at less cost. Some day we hope you will give us careful consideration, for we believe you will find it advantageous to do business with the Bohn organization.



**CONSULTANTS
TO AMERICAN
INDUSTRY**

BOHN ALUMINUM AND BRASS CORPORATION
GENERAL OFFICES—LAFAYETTE BUILDING
DETROIT, MICHIGAN

Designers and Fabricators
ALUMINUM • MAGNESIUM • BRASS
AIRCRAFT-TYPE BEARINGS

Reg. 13 Revised; SRC Ruling Made

Washington

• • • The entire text of Priorities Regulation 13, which controls special sales of industrial materials, has been revised to make it more readily understandable. The amended regulation, announced last week by the WPB, makes no substantive change as far as rules and methods of operation are concerned.

However, the schedule attached to

the regulation has been altered so as to provide that special sales of aluminum, copper and steel in controlled material forms may be made only to a person who could place an authorized controlled materials order for the item. This does not apply to steel reported as idle and excessive to the Steel Recovery Corp.

In this connection, the WPB Redistribution Division pointed out that

Ore Consumption in June 6,939,998 Tons

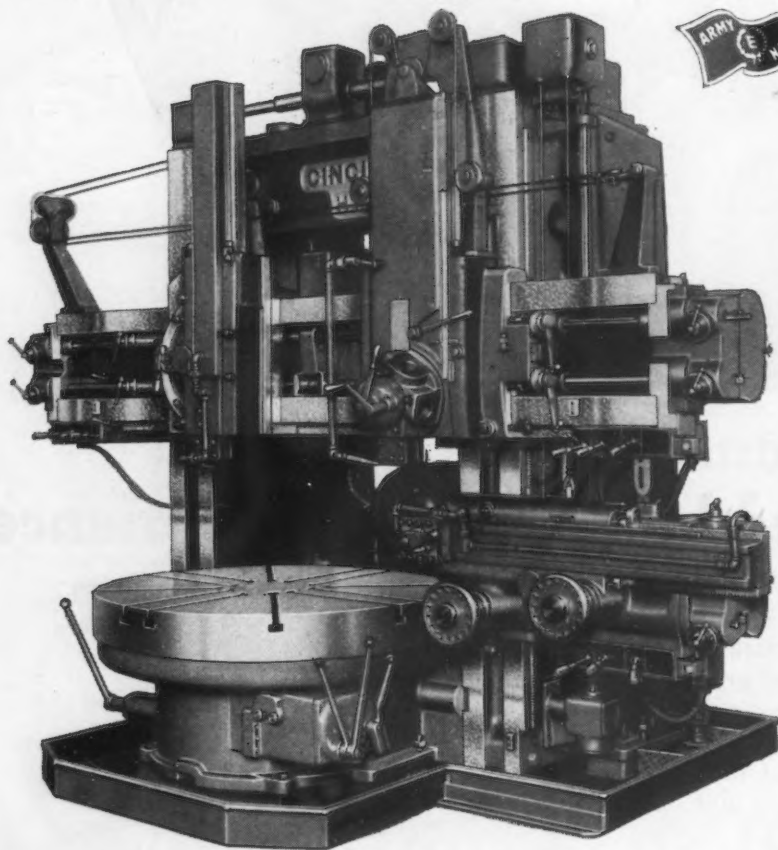
Cleveland

• • • Blast furnace consumption of Lake Superior iron ores during June, 1943, totaled 6,939,998 gross tons, of which 6,730,123 tons were consumed by furnaces in the United States and 209,875 tons by Canadian furnaces. Total consumption in May was 7,373,972 gross tons. Consumption for the year to July 1, 44,092,720 gross tons, is well above that consumed during the same period of 1942, or 41,940,717 gross tons.

As consumption increases, stocks of ore fall behind those of 1942. On July 1, 1943, the total stockpile was 26,098,245 gross tons. Last year at the same time there were 30,930,991 gross tons stocked.

Cincinnati

HYPRO VERTICAL BORING MILL



• This 64" Boring Mill, now available for early delivery, is the heaviest manufacturing type mill of its size. Write today for illustrated bulletin 1301 describing many exclusive Hypro-duction features.

The **CINCINNATI PLANER Co.**
CINCINNATI OHIO, U. S. A.
PLANERS • PLANER MILLERS • VERTICAL BORING MILLS

because of the nature of the stocks of idle and excessive steel listed at Steel Recovery Corp., and because of the need to supplement quarterly allotments of steel, the WPB is prepared to permit the purchase of such material without requiring the buyer to count the steel bought against his current CMP allotment.



PAY ENVELOPE STUFFERS: These notices to combat absenteeism were prepared for distribution in defense plants by the Goodyear Printing & Stationery Co.



CHURNING THE SEAS

*with
Barium Steels*



THE first rotations of many Destroyer Escort propeller shafts occur on lathes in the shops of Barium, where such shafts are turned.

But before that, the steel itself was melted and refined in Barium's furnaces and forged under Barium's giant presses and hammers and scientifically heat treated.

Through the unified control of all these operations from the furnace to the lathe, Barium provides our fighters with propeller shafts and thrust bearings for destroyers and other vessels . . . with breech blocks and housings for light and heavy guns — all of super strength and finest quality — meeting the exacting specifications of the Armed Forces.

BARIUM

STAINLESS STEEL CORP.

*Producers of
Stainless and Alloy Steels*
CANTON • OHIO

LABORATORY FURNACES *New!*

New in appearance and construction, Lindberg Laboratory Furnaces make available to the laboratories of the nation benefits of performance found only in today's modern industrial furnaces.

NEW! By employing a modern principle of smooth, "stepless" control, the Lindberg Input Control gives any desired degree of heat within the temperature range of the unit, which runs to 2000°F. maximum.

NEW! Convenient manually operated door mechanism, as used in present day production furnaces, is provided in the vertical lift door of the box type unit shown on the opposite page. The hot side of the door faces away from the operator thereby adding to his comfort in handling work in and out of the furnace.

NEW! Rugged heating elements of the low voltage type permit higher operating temperatures with longer life and fewer replacements. These elements are patterned after the type that daily stand the abuse of heavy schedules in production heat treating shops.

NEW! Furnace design matches in appearance, other modern laboratory equipment. The neat, streamlined shape contributes to the high standard of laboratory cleanliness.

The box furnace comes in two convenient sizes:

	Type B-2	Type B-6
Chamber width	4½"	7½"
Chamber depth	10"	14"
Chamber height	3"	5"

FOR FURTHER INFORMATION SEE YOUR LABORATORY EQUIPMENT DEALER

OTHER PRECISION UNITS WHICH COMPLETE THE LINE OF LABORATORY FURNACES ARE THE COMBUSTION TUBE TYPE, CRUCIBLE TYPE AND HOT PLATES.

SOLD EXCLUSIVELY THROUGH LABORATORY EQUIPMENT DEALERS!



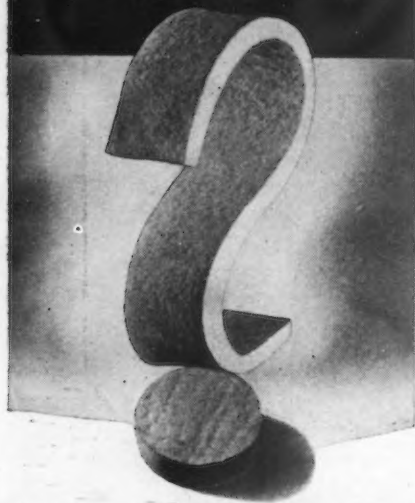
LINDBERG

Well-known throughout the world as the leaders in
developing and manufacturing industrial furnaces.



LINDBERG ENGINEERING COMPANY
2450 West Hubbard Street • Chicago, 12, Illinois

How strong
CAN
felt
BE MADE



TENSILE breaking strength as great as 1016 pounds per 2-inch width was observed during laboratory tests of 2" x 10" strips (0.375" to 0.5" thick) of six different Booth felt types.

Almost any desired combination of qualities ... durability is only one ... are obtainable through the controlled manufacture of Booth "prescription" felts and precision die-cutting into mechanical parts. Read Booth's "Technique of Felt Making."

THE BOOTH FELT COMPANY
477 19th Street Brooklyn, N. Y.
747 Sherman Street Chicago, Ill.

APPLICATION CHART AND SAMPLE KIT ... Contains swatches of S.A.E. felt types, with specification tables. Write for it. (No sales follow-up.)

Booth
TRADE MARK

**PRECISION CUT
FELT PARTS**

Reg. 4 Gives Warehouses Flexibility; Four Types of Orders Spelled Out

Cleveland

... Under the revised CMP Reg. 4, greater flexibility is permitted steel warehouses in handling deliveries from warehouse stock and also from consigned stocks. Now, orders bearing CMP allotment numbers for a specific quarter may be accepted by the warehouse and filled during the 4½-month period from 15 days before the beginning of the specified quarter to 30 days after that date.

In another important revision to the regulation, warehouses are permitted to apply to WPB for approval to ship 40,000 lb. or more. Heretofore, it was the duty of the customer to apply for this permission.

The revised regulation lists four classes of warehouse orders. These are: (1) Orders that must be rejected; (2) orders that may be rejected; (3) orders that must be filled, and (4) orders that may be filled.

Orders That Must Be Rejected:

(1) Orders for delivery to any one person at any one time at any one destination for 40,000 lb. or more, unless acceptance of the order is authorized by WPB on specific request or unless the order includes 10 or more individual items which differ from each other in quality or cross section and no item weighs more than 8000 lb.

(2) Any order for delivery before or after the dates for which an allotment number is valid. An allotment number is

valid during the quarter, 15 days before, and 30 days following.

(3) Any order that the warehouse is not required or permitted to fill, as shown under section, "Orders That May Be Rejected."

Orders That May Be Rejected:

(1) Any order not specifying immediate delivery. If it is chosen to accept an order for future delivery, steel cannot be reserved to fill it. Orders specifying immediate delivery of a type that the warehouse is required to fill takes precedence over orders specifying delivery in the future.

(2) Any order for material not in stock or in transit to the warehouse.

(3) Any order that WPB authorizes the warehouse to reject. If acceptance is undesirable because filling it would deplete stock, application to WPB may be made to reject all or part of it and delay in filling the order until WPB acts is permissible.

Orders That Must Be Filled:

(Except when rejection is required or permitted as indicated above.)

(1) All authorized controlled material orders.

(2) All orders for delivery to farmers as required by Priorities Reg. 19.

(3) All orders with AAA preference ratings. A controlled material order carrying this rating must be filled in preference to all other authorized controlled material orders regardless of time of receipt.

Orders That May Be Filled:

(1) Orders in amounts of \$10.00 or less, for which no ratings or certification are needed.

(2) Orders from one customer during any calendar quarter of not more than 10 tons of carbon steel, 1000 lb. of stainless steel, and two tons of other alloy steel providing deliveries of any one product group and type to one customer do not exceed amounts shown in table.

	Lb. per quarter (unless otherwise stated)		
	Carbon (including wrought iron)	Stainless	Alloy other than Stainless
Tool steel, including drill rod.....	300	...	300
Tool steel bits.....	...	...	5
Mechanical tubing.....	1000*	100*	300*
Wire rope and strand.....	300*	...	...
Music wire.....	300	...	...
All other wire and wire products in controlled materials form.....	2000	100	...
Pipe.....	2000	...	...
Galvanized, lead-coated, and painted sheets and strip including formed roofing and siding.....	2000	...	...
Tin and terne plate.....	2000	...	...
Fence posts.....	2000	...	...
All other steel products.....	20,000	1000	4000

*Feet per quarter

Certification form used for sales without allotments is contained in CMP Reg. 4, or the customer can use the form provided in CMP Reg. 7. Users of large quantities of steel may not use the small orders provisions to obtain additional tonnage. Any person buying in the limited quantities permitted under the regulation cannot receive carbon steel in any quarter from all sources combined in excess of 10 tons.

Serving and Conserving —

DOING TWO VITAL WAR JOBS . . . RUSTLESS is proud that it has the facilities and the "know-how" to do two war jobs of singular importance.

First, we are producing more Stainless Steels than any other plant in the nation. That is because we are the only plant whose entire resources are devoted to making this one, vital, strategic material and nothing else. Already Stainless Steel's exceptional properties of high tensile strength and remarkable resistance to corrosion by heat, acid and rust have made it a must in the production of the most vital war equipment.

Second, the unique RUSTLESS processes are conserving two metals that are critically scarce. These metals . . . Chromium and electrolytic Nickel . . . are essential, not only for the manufacture of Stainless Steel but for many other war requirements as well. RUSTLESS has largely "by-passed" their use by the discovery of ways to achieve equal results through the use direct in the furnace of ores and through the recovery of stainless steel scrap, both of which are in ample supply.

Thus, RUSTLESS is both *Serving* and *Conserving*; two jobs that we will continue to do with all our might and with all our resources throughout the war and in preparation for the peace to come.



BUY U. S.
WAR BONDS
AND STAMPS



RUSTLESS
CORROSION AND HEAT-RESISTING
STAINLESS STEELS

RUSTLESS IRON AND STEEL CORPORATION • • • BALTIMORE, MARYLAND

High Alloy Machining Costs Held

Washington

• • • Maximum charges for machining which may be made in connection with the sale of high alloy castings by producers were established on a March 31, 1942, basis by OPA last Thursday.

Previously, these charges were on an October 1 to 15, 1941 basis.

The change is made in Amendment

No. 1 to Maximum Price Regulation 214 and becomes effective July 27.

In cases where the producer of the high alloy castings has the machining performed by an independent machine shop the producer's maximum charges are fixed as the costs of the machining to the producer plus his customary markup on March 31, 1942.

Where the producer of high alloy

Order L-30-d Ups Civilian Steel Use

• • • First easing of civilian steel is seen in the relaxing of restrictions on ten sorely-missed household articles, with the amendment of General Limitation Order L-30-d.

Production of workers' lunch boxes and miners' dinner buckets—completely stopped during the first half of this year—will be resumed for the remainder of 1943 at 100 per cent of the base year rate.

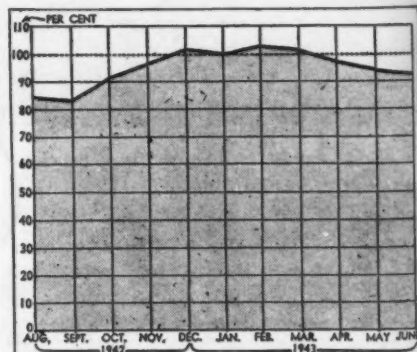
The amended order also permits production of such articles as lunch boxes, baking pans, carpet sweepers and kitchen utensils.

castings performs the machining in his own machine shop, maximum charges he may make are established on the basis of his pricing methods, cost factors and profit margins in effect on March 31, 1942.

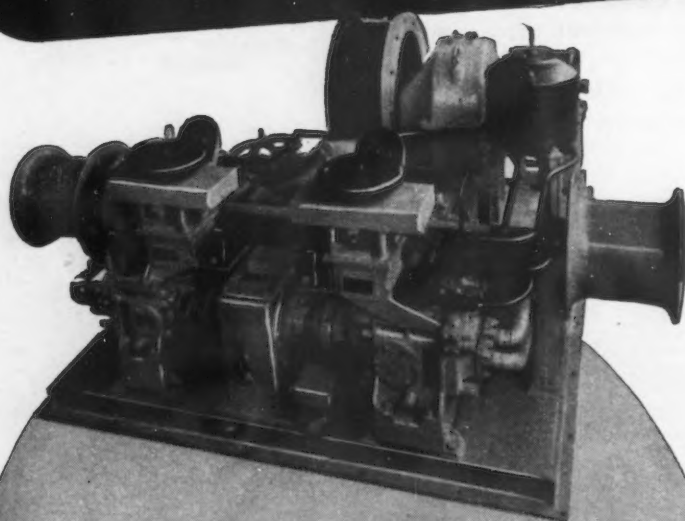
Sykes Named to CPRB

• • • William L. Batt on behalf of WPB Chairman Donald M. Nelson announced the appointment recently of Howard C. Sykes, U. S. Deputy Member and Executive Secretary of the Combined Raw Materials Board, as U. S. Executive Officer of the Combined Production and Resources Board. Mr. Sykes will continue as Executive Secretary of the Combined Raw Materials Board.

ORDNANCE PRODUCTION in the Chicago district has failed to meet first-of-the-month estimates for four consecutive months, according to this chart which was recently released by Brig. Gen. T. S. Hammond, district ordnance chief. Manufacturers' first-of-the-month estimates for production equal 100 per cent on the graph.



made to "order"



These electro-hydraulic winches are typical of the special hoisting machinery developed and manufactured by BAYARD. They represent just one instance of the many types of naval equipment designed, engineered and furnished by this company to individual specifications.

BAYARD

The coveted Navy "E" Pennant—awarded to Bayard for excellence in fulfilling Naval contracts.

M. L. BAYARD & CO., Inc. • ENGINEERS • MACHINISTS • PHILADELPHIA

CUTTERS

7½"

WORK

in **8** minutes
on the
PLANETARY



The work is a propeller shank! In 8 minutes the external surfaces indicated by the heavy lines are Planamilled within the customary close aircraft tolerances. Investigate what the Planetary can do for *your* production.

HALL PLANETARY COMPANY

Fox St. and Abbotsford Ave., Philadelphia 29



easy for fumble fingers . . .

• The pin pictured above is formed in lengths ranging from a couple of inches to twenty or more feet.

A single strand of this tough, resilient, stainless steel laces the cowls of our air fleet—holds them securely in position. Used like a cotter key these pins speed production and save time when a.a. flak finds its mark, necessitating behind-the-line repairs.

This is just one example of the thousands of shapes which may be produced on our automatic wire forming machines. When you need action—

Write, wire, or better still
. . . phone us.

**AMERICAN
SPRING OF
HOLLY, INC.**
HOLLY, MICHIGAN

Briefly Told—

Army Orders Release of 4500 Soldiers for Mining of Vital Metals

• Release of 4500 men from the Army to accept jobs in copper, zinc and molybdenum mines was authorized July 20 by Robert P. Patterson, Acting Secretary of War. He said efforts to recruit miners from civilian sources had failed, and the success of the military programs for the next year "is jeopardized by a growing shortage of these vital metals." Men released will be taken from units stationed in the west.

• New Yorkers got their first look at the new tank killer, "The Priest," on July 21 when one built by American Locomotive Co. was exhibited in the rear of the public library. Technically, "The Priest" or M-7 is a mobile anti-tank gun of American design which was used with great success by the Eighth Army against Rommel in North Africa. It got its name because it resembles a pulpit mounted on a tank.

• Who discovered radar? Because of the controversy on this subject, the War Department is reported to have requested that all advertising and publicity of the radio-location device be discontinued.

• Eight Army ordnance plants in operation have been closed or their completion cancelled because of changing war and lend-lease needs, the War Department informed the House Military Affairs Committee recently.

• The government has spent \$25,000,000,000 in the last three years to build industrial plants and other facilities, says Jesse Jones, asserting that one of the nation's greatest problems after the war will be the disposition and utilization of these properties.

• Lend-Lease aid rendered during the month of June totaled \$1,030,000,000, bringing the aggregate value to \$12,923,000,000. The billion-dollar total for June, 1943, compares with \$790,000,000 in May, 1943, and \$548,000,000 in June, 1942.

• By Aug. 15, five additional stations of the 1362-mile "Big Inch" pipeline will be in operation and oil deliveries from Texas to the East will be stepped up to 200,000 barrels a day. Welders at Phoenixville, Pa., sealed the final sections of the line, which cost \$95,000,000, July 19.

• National Industrial Advertisers Association, Inc., has requested and been given by the WPB a major part in the tool conservation campaign recently instituted by WPB.

• Looking forward to post-war demands, the Glycerine Producers Association sees important prospects for the use of glycerine in the food industry. Research has already developed a quick freezing process for food by using a 50 per cent glycerine solution. Other recent discoveries relate to the value of glycerine in making chocolate bars resist hot weather, and in preserving peanut butter.

• The July 20 program of "This Nation At War" over the Blue Network featured Coatesville, Pa., and its industrial production for war. Robert W. Wolcott, president of Lukens Steel Co., was one of the participants.

• The first award in the entire country of the United States Army Guidon as an honorary flag to an Auxiliary Military Police unit was presented to the Western Gear Works, Seattle, recently.

• From zero mark to more than 1,000,000 lb. of aluminum aircraft forgings is the record of the monthly production of Willys-Overland Motors Co., Toledo, Joseph W. Frazer, president revealed recently.

• An electric roller hearth copper-brazing furnace was needed quickly by the Universal Corp. in Dallas, Texas, to meet deadlines on a chemical warfare product. In one month's time, two weeks ahead of any similar installation made previously, the furnace was installed by General Electric engineers working day and night with Universal mechanics.

• New England governors were warned recently by Carl A. Gray, Plainville, Conn., manufacturer, that unless the states took a firm hold on the postwar reemployment of servicemen they would see "a Federal plan that would swell even beyond the gargantuan present structure of the Federal payroll." Mr. Gray is author of such a postwar plan which has already been put into effect in Connecticut.

• A new robot aiming device known as the gyro-stabilizer increases by several hundred per cent the shooting accuracy of new Army tanks while in motion. The device was developed by the Westinghouse Electric & Manufacturing Co., Pittsburgh.

• Relocation of a plant at the Homestead Works of Carnegie-Illinois Steel Corp. from Pittsburgh to McDonald, Pa., is under way. The plant is being moved to McDonald to make way for the new facilities being constructed at the original location. It is a plant for the fabrication and manufacture of roadway deck material.

• Continuing to climb upward, despite counter national trends, war production in the automotive industry in June reached a total of \$725,000,000 compared with \$705,600,000 in May, \$672,000,000 in April and with \$383,800,000 in June a year ago.

COST OF LIVING

MONTHLY PERCENTAGE INCREASES

SEPT. 15, 1942—MAY 15, 1943

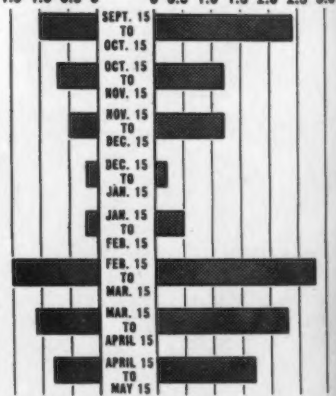
COMBINED
INDEX

FOOD

PERCENT

PERCENT

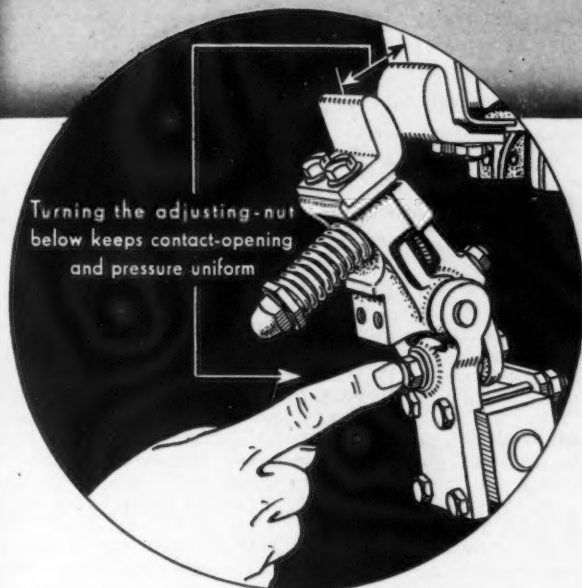
1.5 1.0 0.5 0 0 0.5 1.0 1.5 2.0 2.5 3.0



SOURCE: BLS

Consistent Results in WELDING

CONVENIENT ADJUSTMENT COMPENSATES FOR
WEAR AND PERMITS HIGH-SPEED, UNIFORM OPENING



This single adjustment is easy to make and requires only the simplest tools. Any operator can make it and thereby insure consistent welding results by keeping opening-time uniform.

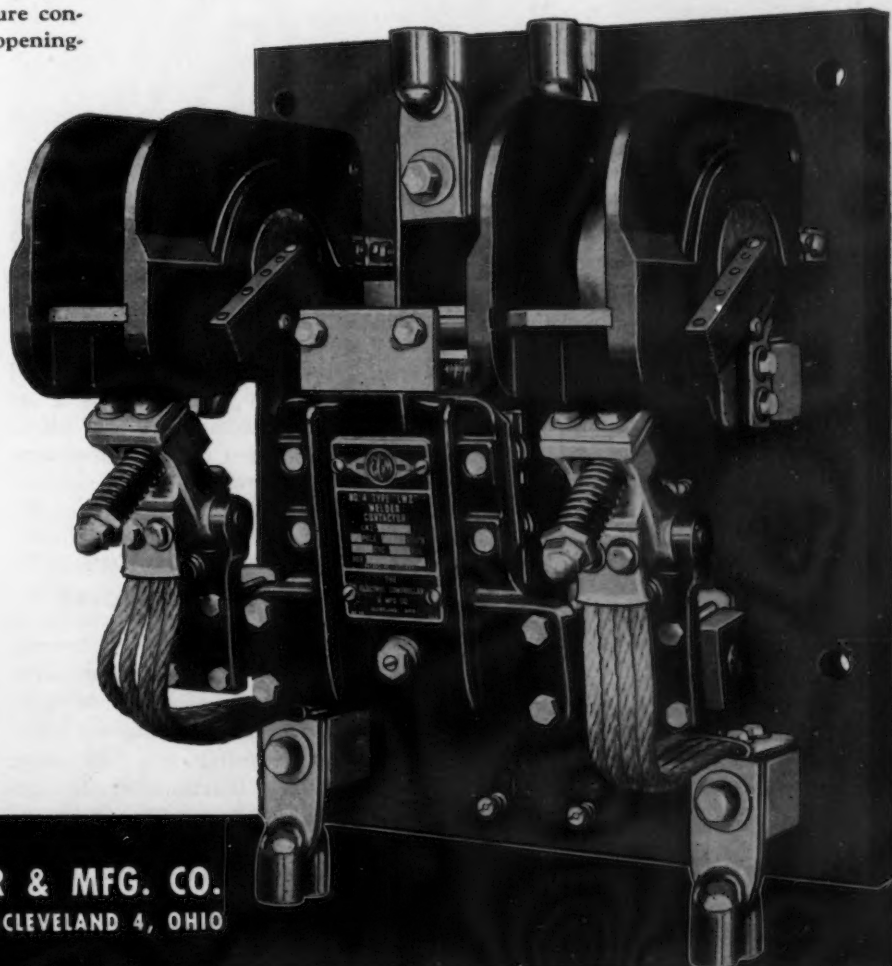
We build six standard sizes of welder contactors. At the right is the No. 4W size. Ratings are based on duty cycle curves as shown in Bulletin 1211.



THE ELECTRIC CONTROLLER & MFG. CO.
2698 E. 79th STREET ★ CLEVELAND 4, OHIO

THESE heavy-duty LWZ Magnetic Contactors insure good welds at low cost. They are not an adaptation of a standard contactor but are designed especially for welding service. They have a readily accessible contact-adjustment which permits high-speed, uniform opening, giving consistent welding results.

Outstanding due to their high arc-handling ability and low upkeep, these EC&M Contactors are unmatched in performance. Deliveries can be made in reasonably good time. Ask for Bulletin 1211.



FOR MORE ACCURATE
PRODUCTION GRINDING

USE

**OAKITE
GRINDING
COMPOUND**

To meet today's wartime requirements for turning out closer, more accurate work with smoother, finer finishes in wet grinding all types of steel, many leading concerns are using Oakite Grinding Compound.

It is their preferred choice... their STANDARD and APPROVED material... for this essential production operation for several important reasons. First, Oakite Grinding Compound provides maximum cooling and proper lubricity. Second, it keeps wheels CLEAN and FREE-CUTTING... reduces loading and glazing to a minimum so that less dressing is required. In addition, this superior coolant helps prevent rusting, helps keep supply tank and lines clean, has high resistance to rancidity, is odor-free and economical, has long solution life.

20-Page Booklet FREE!

Gives specific directions and formulas for using Oakite Grinding Compound. Also contains formulas for cutting and machining ferrous and non-ferrous metals. Write for your FREE copy TODAY!

OAKITE PRODUCTS, INC.
30H Thames St., New York 6, N. Y.

Technical Service Representatives Located in All
Principal Cities of the United States and Canada

OAKITE *Specialized cleaning*
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

NEWS OF INDUSTRY

Ingenuity Flourishes

More Examples of Savings in
Materials, Hours and Machines Noted

Ottawa, Ont.

... Canada's campaign for conservation of materials, man-hours and machine tools still is achieving remarkable success. Here are some of the results, listed by Lionel Chevrier, parliamentary assistant to the minister of munitions and supply, speaking in the House of Commons recently:

Bren gun body—Redesigning the forging dies nearer to the finished shape saved 1,200,000 lb. of steel and a large amount of chrome, plus 10,000 man-hours of machining time. Total estimated monetary saving—\$125,000.

Small catch for Bren gun magazine—Originally built up with welding rod and then machined to shape, it was found possible to accomplish the same purpose by three press operations, and the result has been a saving of 198,000 lb. of welding rod, and \$39,000 worth of oxygen and acetylene. The saving in labor has been 515,000 hr. and ten machine tools have been eliminated. The value of this conservation project is about \$329,000.

Bipod assembly on Boys anti-tank rifle—was redesigned to be made from a malleable iron casting instead of from a steel forging, steel tubing and bar stock. The annual saving here has been estimated at 771,600 lb. of steel forgings; 72,000 lb. of seamless steel tubing; 164,500 lb. of bar steel; 477,600 hr. of labor and 77 machine tools. Savings estimated to total \$1,780,000.

Fuse for 25-lb. shell—This was originally machined from brass bar stock. The fuse was re-engineered to be made from zinc die castings. This resulted in saving 44,000,000 lb. of brass. At the same time, 816,000 hr. of labor were saved annually and 15 machine tools were eliminated. This conservation project can be valued at over \$6,500,000.

Track sprocket for universal carrier—Originally rough flame cut from steel plate and partly finish machined all over. Now the sprocket is made from centrifugally cast steel and the only machining necessary is the boring of the hole for the shaft and the drilling of a few small holes. The annual saving in plate stock is nearly 9,000,000 lb.; 725,000 hr. in labor have been saved, and the total saving can be valued at \$1,700,000.

Reductions in prices—No. 119 fuze, reduced from \$3.05 to 65c.; 100-round Bren magazine, price reduced from \$38.58 to \$18; 2-in. trench mortar, price reduced from \$120.48 to \$80; 3-in. trench mortar, reduced from \$345.65 to \$236; Universal carrier, price reduced from \$3825 to \$2,900; 2-in. bomb thrower, reduced from \$81.81 to \$67.05; 3-7 a.a. gun barrel (forged), \$1650 to \$900, (machined), \$1733 to \$375; 40 m.m. gun barrel (forged), \$187.20 to \$160, (machined), \$460.53 to \$183.40; 2-lb. gun barrel (forged), \$178.50 to \$171.60.

Conclusion—Fixed prices on ammunition components for the second quarter of 1943, as compared with the first quarter, indicate a total over-all saving of \$2½ million.

Continental Steel Profits Down Slightly

... Continental Steel Corp. and subsidiaries declared a net profit for the quarter ended June of \$216,179.16, equal to 99c. per common share which compares with \$234,410.02 or \$1.02 per share for the same quarter of last year. For the first six months of 1943 net profit was \$334,338.02 or \$1.49 per share comparing with \$403,747.39 or \$1.70 per share for the same period of last year.

Canadian Import of Farm Machinery To Be Increased

Ottawa

... Production and imports of farm machinery for Canada will be substantially increased during the next 12 months, according to a new order issued by the Wartime Prices and Trades Board. H. H. Bloom, administrator of farm machinery, stated that the order provides for a supply of farm equipment equal in tonnage to approximately 77 per cent of the average of 1940 and 1941 output and

represents an increase of about 130 per cent over supplies provided by the previous farm machinery control order.

WPB Says PD-83-b Forms Still Active Until Replaced

Cleveland

... According to F. R. Burns, of the warehouse branch of the WPB steel division, it is not necessary for general steel product warehouses to file a copy of PDL-2228 with producers, if they have in their possession an active copy of PD-83-b. PDL-2228 is the new general steel product warehouse certificate that replaces PD-83-b. However, the new form is being sent only to warehouses whose PD-83-b forms have been corrected for any reason. Since it is impractical at present to recall all of the PD-83-b's outstanding and replace them with the new forms, both forms are currently active and only those warehouses who have received PDL-2228 need submit photostatic copies of that form to their suppliers. Other warehouses will continue to use form PD-83-b.

Leonard Rites Held; Bethlehem Manager

Washington

... E. R. Leonard, manager of the Washington office of the Bethlehem Steel Co. since 1914, died in Los Angeles July 13. Graduated from the Naval Academy in Annapolis in 1907, he served in the Navy about four years. Retiring from the Navy with a rating of midshipman, Mr. Leonard started with Bethlehem in the ordnance department. After serving in that capacity he established the company's Washington office because of his specialized knowledge of steels and ships used by the Armed and other Government services.

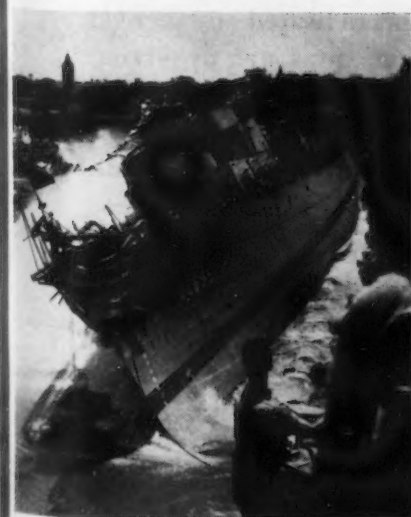
Services were held at the Fort Meyer, Va., Chapel last Saturday. Burial was made in the Arlington National Cemetery. Pall bearers were Vice Admiral Richard S. Edwards; Rear Admiral Randall Jacobs; Rear Admiral Leslie Brotton; Capt. David I. Hedrick; Paul Mackall, vice president of Bethlehem; G. W. Struble, assistant vice-president of Bethlehem; Leo C. May and Spencer Gordon.

New Dominion Furnace

Toronto

... Dominion Steel & Coal Corp., Ltd., has completed and blown in its new blast furnace at Sydney, N. S., with a capacity of 1000 tons, increasing Dominion Steel's pig iron capacity from 490,560 to approximately 850,000 tons per year.

LAUNCHED ON LAKES: The destroyer escort, U.S.S. Rich, slides sidewise into a slip off the Saginaw Bay at the yards of the Defoe Shipbuilding Co., Saginaw, Mich.



Finer Appearance— Better Performance

IN NEW LO-X *Ventilated* FEEDER BUS DUCT

**Yet It Saves Much Steel
and Copper In Conformity
with WPB Limitation Order L-273**

On Feeder runs, Bulldog's Ventilated Type LO-X Duct puts more power through to branch circuits with less voltage drop. The screened casing not only improves appearance but prevents excessive heat—cuts weight—conserves a maximum of critical materials.

At the same time, Ventilated LO-X shares all the basic advantages of Bulldog BUStrribution Duct design. It is quickly and easily installed—has full asset value—is 100% salvable.

LO-X Ventilated Bus Duct for Main Feeders is available in the new WPB ratings of 800A, 1000A, 1350A, 1600A and 2000A. Single-phase, 3-phase, and 3-phase 4-wire; 600 Volts or less.



Flexible Light and Power

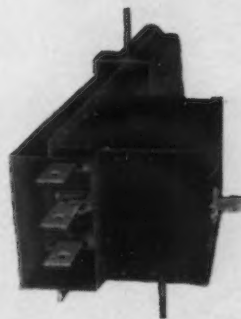
(Above) This shows a Branch Circuit run of BUStrribution DUCT with circuit protective devices plugged in at points most convenient to the machines they energize and protect. Each 10-ft. section of plug-in duct has 10 outlets for the insertion of these plugs, which can be readily moved with the machines and instantly plugged in at any other desired location. It is 100% flexible and salvable.

Capacities available under new WPB standards are 250A, 400A and 600A for branch runs of Plug-in Bus Duct.

MANUFACTURERS OF a complete line of Vacuum-Break Safety Switches, Panelboards, Switchboards, Circuit Master Circuit Breakers and BUStrribution SYSTEMS.

You SAVE when you SPEND on WAR BONDS

Plug-in Type for Branch Circuits



(Right) End view of a branch circuit plug mounted on a bus duct section. Note how the copper "contact fingers" of the plug, inserted through a plug-in opening in the duct casing, clamp over the busbars in the duct.

Wiring between plugs and machines is made in short runs of rigid or flexible conduit.

Plugs may be of the fusible switch type or automatic circuit breaker type and are readily interchangeable. Capacities: 30A to 600A; 600 Volts or less.

BULLDOG
ELECTRIC PRODUCTS CO.

Detroit, Michigan

Bulldog Electric Products of
Canada, Ltd., Toronto, Ontario
Field Engineering Offices
in All Principal Cities





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FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

NEW PRODUCTION TEAM DELIVERS THE GUNS FOR VICTORY

The new 75mm. gun, descendant of the famous French 75 of World War I, is winning victorious acclaim in this war for and by our armed forces. This powerful weapon is one of the keystones in the teamwork our armed forces are employing on the fighting front to defeat the enemy.

Likewise on the industrial front it is teamwork that is producing these 75mm. gun-barrels at a fighting pace. The steel comes from a leading alloy steel manufacturer in the form of solid rounds eight feet long. At the Jones & Laughlin seamless tube mills, where oil country pipe is normally produced,

these alloy steel rounds are heated and pierced their full length. Next steps are upsetting (forging) the breech end and heat-treating by a famous bearing manufacturer. Final stage is the machining and rifling by a New England machine tool company.

Four steps — four companies — each doing for Victory the thing best suited to its experience, skill and equipment. This is another example of war cooperation taking the place of competition in industry . . . of teamwork on the production fronts that matches the teamwork on the fighting fronts among our armed forces and those of our allies.

Solid rounds of alloy steel
for 75mm. gun-barrels are
pierced on a pipe mill by
J&L skilled workmen

BACKGROUND FOR BETTER LIVING

Written from material furnished Jones & Laughlin Steel Corporation by companies named.

Better living in peacetime will result from many applications of "know-how" now fast developing under the stimulation of production for War, Chairman A. W. Robertson of Westinghouse believes. "Industry's responsibility after the war," he says "will be to provide the breadth of vision needed to find ways and means to put this know-how to work to make a better civilization."

Post-war motoring and flying will benefit from new products perfected by the petroleum industry under the driving force of war. Cars and planes designed to use new fuels and lubricants to their best advantage will go many more miles per gallon and be easier and better and cheaper to drive. George H. Freyermuth, Standard Oil of New Jersey engineer, says that "Many will be the other benefits laid at our doors as a result of petroleum being at war. Plants will be producing many new peacetime products in enormous quantities. There will be cheaper chemicals, new synthetic rubbers, new plastics. Just around the corner lie new solvents, new textile fibers, new soaps, new materials of many kinds."

Famous "bubble bath" scene in Clare Boothe's play, *The Women*, was made dramatically possible by a new lather-sustaining detergent (cleaning agent to us) based on alkyl aryl sodium sulfonate, a petroleum derivative, Allied Chemical & Dye Corporation reports. Today the Navy is using this new latherable salt water "soapless soap" in millions of pounds. It is a product of American research to develop a substitute for palm oil, a War casualty, and will have peacetime applications as yet undreamed of, not only as a "soap" but industrially, for example, to clean steel in pickling processes, according to Analine's Lawrence H. Flett in his American Chemical Society medal address.

More economical containers for many post-war foods, and other products will be the result of war-time research looking toward stretching the tin supply, American Can Company reports. "Several thousand tons of tin will be saved during 1943 as a result of the use of electrolytic tinplate and chemically-treated black plates," the company states. "One of the principal reasons why there has been an ample supply of metal cans for essential foods during the war is because great container manufacturers have been able to utilize more readily available supplementary protective coatings, applying them to the tin-less plate or thinly plated metal developed by the steel companies. The continuous improvement in steel manufacture and treatment has been a great help in conserving supplies during the war and in laying the foundation for after-war development."

Today's "Blackout" plants, with air conditioning and refrigeration for precision

manufacture of materials for war are "fore-runners of the efficient, healthful plant of the future" predicts Herbert L. Laube, Director, Development Division, Carrier Corporation. "Factories so designed," he says "completely air conditioned, will be employing hundreds of thousands of workers before the war is over, and it is unthinkable that industry in the post-war period will scrap such plants or turn back to outmoded factories." Mr. Laube points out four-fold function of air conditioning to be: control of temperature, movement of air, cleanliness of air, and of humidity.

Oil men, loggers, road builders and others whose operations are in mud, sand or over rough terrain believe that they see a post-war application for one of the types of vehicles being supplied to the United States Army Ordnance Department by the White Motor Company. The wartime Half-Trac can attain high speeds on the highway as well as negotiate the most difficult terrain. It is being used on all the fighting fronts of the world as tank destroyers, scout cars and personnel carriers. The Half-Trac, with its armor plate, employs nearly 6½ tons of steel.

Steel pinions forged (instead of machine cut) is an important contribution of Timken-Detroit Axle Company to saving steel for war that will be reflected in stronger differentials in our autos, trucks, buses in peacetime, especially since complete information on the revolutionary process has been made available to other manufacturers of the same type of equipment. By forging, two high traction differential pinions can be made from approximately the same quantity steel that made only one pinion by machining, and the product is stronger.

75,000 lbs. of earth (25 cubic yards) is the morsel nipped up with every operation of a Marion Walking Dragline when it is stripping soil off the top of buried coal veins, going deeper than ever before, to meet the present demand for more and more fuel supplies for war factories. Coal stripping operations are increasing materially above the 10% they formerly represented of the nation's coal supply. Equipment such as this which digs deeper and dumps farther at less cost will tend to maintain its revolutionary effect on coal production after the war is over.

Synthetic rubber tires are at work successfully in one of country's large steel mills. The B. F. Goodrich Co. reports, "Four experimental tires, constructed entirely of synthetic rubber were built, two of the 22x16x16 and two 22x12x16. They are of the Press-On type, for use on industrial power trucks and are being operated in the plants of the Jones & Laughlin Steel Corporation at Pittsburgh. Latest reports on the tire performance is that they are holding up as well as tires made of natural rubber previously used."

JONES & LAUGHLIN STEEL CORPORATION

ALQUIPPA
WORKS



PITTSBURGH
WORKS



PITTSBURGH, PENNSYLVANIA
CONTROLLED QUALITY STEEL FOR WAR

Control of Cargo Handling Enables New York to Double 1917-18 Exports

• • • In his second quarterly report, Carl H. Henrikson, Jr., New York regional business consultant of the U. S. Department of Commerce, pointed out that despite many handicaps the Port of New York is currently handling almost double the outgoing cargo of 1917-1918, and is handling it with less equipment and none of the confusion and congestion experienced during the first World War.

Clogging of the port is avoided by control of shipments to the docks by the Transportation Control Committee made up of representatives of the Army, Navy, ODT, War Shipping Administration and the British Ministry of War Transportation. This committee, in daily meeting, determines quotas for permits to move goods to ports depending on ship bottoms available. Port-bound rail shipments can be shunted on short notice to storage places some distance from the

port, should emergency require such action, the report explained. These storage facilities have been kept remarkably clear by a system of shipment permits, open-ground storage and organizing cargoes in depots some distance from the port.

The capacity of any port is dependent largely upon cars of freight that can be cleared. The American Association of Railroads estimates that the daily capacity of the Port of New York is about 1400 cars. Only a small percentage of exports reach the port by truck.

Peril to coastwise shipments and a shortage of tankers have added tremendously to the rail burden, particularly in transporting oil and coal to the New York and New England region. Eight trunk line railroads serve the Port of New York. They are the New York Central; Pennsylvania; Erie; New York, New Haven

Connecticut Takes Iron Mines for War

• • • The Ore Hill iron mine in Salisbury, Conn., along with other deposits throughout Connecticut, have been taken over by the state so that core drilling and other exploratory measures can be conducted to determine how soon the mines can go into war production.

First deposits from the old Ore Hill mine were used during the Revolutionary War, and the mine is expected to again produce for war today.

& Hartford; Baltimore and Ohio, Lehigh, Lackawanna & Central of New Jersey. The New York Central, for example, had in 1942 an increase in freight revenue of 36.1 per cent while the amount of freight carried was 15.7 per cent over that in 1941.

Coke Ceiling Prices May Be Adjusted

Washington

• • • Producers of coke may file applications for an adjustment in their maximum prices when receipts from the sale of their entire production at ceiling prices do not equal total costs of production, the OPA announced last Thursday.

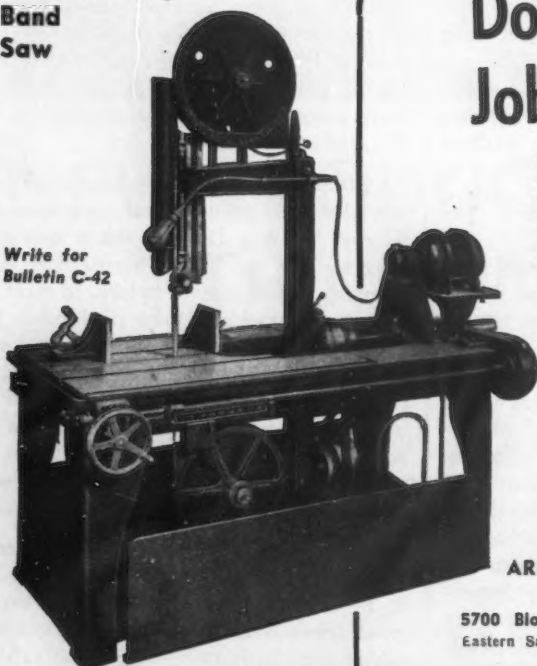
Coke producers previously had been excluded from obtaining relief on these grounds, although the privilege has been available to all producers of miscellaneous solid fuels except coke.

The action, extending the relief provision to coke producers, is embodied in Amendment No. 20 to Maximum Price Regulation No. 121, effective July 28.

The same amendment also makes mandatory the filing of complete data as to costs, profits, price history and other relevant factors in connection with any application for adjustment of miscellaneous solid fuel maximum prices.

Marvel No. 8 Metal-Cutting Band Saw

Write for
Bulletin C-42



Doing its War Job Well!

The busiest tool in the tool rooms, an essential tool in the complete die shop and a time and money saver in the maintenance department, because "it does all things well." The MARVEL No. 8 Metal Cutting Band Saw (capacity 18" x 18") will snip off an 1/8" drill rod, rough out the largest billet or cut a perfect 45° mortise on the end of a large I-beam without any special setting-up. Its large planer type bed takes all work. Its continuous blade feeds into the work at any angle from 45° right to 45° left. It has a large removable vise and a combination hand and/or power feed.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York

MARVEL SAWS

COMING EVENTS

- Oct. 13 to 16—The Electrochemical Society, Inc., New York.
- Oct. 18 to 22—National Metal Congress and Exposition, Chicago.
- Oct. 28, 29—American Institute of Mining Engineers and American Society of Mechanical Engineers, Pittsburgh.

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NATIONALLY RECOGNIZED MANUFACTURERS
ALL OVER THE UNITED STATES USE
HILLS-McCANNA
MAGNESIUM ALLOY SAND CASTINGS

Many of the country's outstanding Aircraft producers have incorporated these castings into vital parts of their products. Our facilities and experience are at your call for possible modernization of your peace-time products where light weight with great strength would be of advantage. We invite you to discuss this matter with us.



HILLS-McCANNA CO.
3017 North Western Avenue, Chicago, Illinois
PROPORTIONING PUMPS • AIR & WATER VALVES • CHEMICAL VALVES
MARINE VALVES • FORCE-FEED LUBRICATORS • DOWMETAL CASTINGS

PERSONALS

• **E. A. Koether** has been appointed technical assistant vice-president and general manager of Koppers Co., American Hammered Piston Ring division. **Edgar S. Freeman, Jr.**, assistant sales manager, will take over Mr. Koether's duties as works manager. As an experimental engineer with the Bartlett Hayward division, Mr. Koether joined the Koppers Co. in 1920, and was transferred to the American Hammered Piston Ring division in 1925. Mr. Freeman who succeeds Mr. Koether joined Koppers in 1920. For two years he was Chicago district manager in the automotive replacement division.

• **Palmer M. Craig**, for the past two years chief engineer in charge of radar and radio communications equipment development, has been named chief engineer of the radio division of Philco Corp., Philadelphia. Mr. Craig joined the Philco Research Laboratories as a radio engineer in 1933. He was appointed engineer in charge of console radios in 1938.

• **Eugene P. Harter** has been made general sales manager of Electro Refractories & Alloys Corp., Buffalo, N. Y. He was formerly sales manager of the grinding wheel division. Before joining the firm, he was associated with the Universal-Cyclops Steel Corp., Titusville, Pa.



ALFRED MARCHEV, who will succeed **Ralph S. Damon** as president of Republic Aviation Corp., Farmingdale, N. Y., on September 1.

• **Raymond C. Stetson** has been named chief of the production service department of the Buffalo War Production Board. He has been serving in the priorities division since last August.

• **Frank J. Kennedy** has resigned as manager of the Riddlesburg Coal & Iron Co., Riddlesburg, Pa., to accept the position of superintendent of the

Pittsburgh Ferromanganese Co., Chester, Pa.

• **R. G. Cox**, who has been with the industrial products organization of the B. F. Goodrich Co., Akron, Ohio, for the last 18 years, has been placed in charge of molded goods sales. Mr. Cox succeeds **E. R. Miller**, who retired recently.

• **Frank McGary**, formerly engineering and mechanical division head of the Murray Corp. of America, Detroit, has been named plant manager of Murray's new operation at Scranton, Pa. **E. R. Weitzel**, coordinating manufacturing manager at Detroit, will be factory manager at Scranton. **E. Kruger**, formerly superintendent of P-47 assembly at Detroit, is production superintendent at Scranton.

• **Frederic I. Lackens**, advertising manager of the Hays Corp., Michigan City, Ind., has been elected president of the National Industrial Advertisers Association, Inc.

• **Henry K. Beebe**, industrial engineer, has been named works manager of the Wales-Strippit Corp., North Tonawanda, N. Y. Formerly superintendent of the Ford Motor plant in Buffalo, Mr. Beebe has been plant development engineer for Bell Aircraft Corp. and chief plant engineer for Brewster Aeronautical Corp.

• **I. F. Sweeney**, former chief project auditor for the Milwaukee ordnance



EUGENE P. HARTER, general sales manager of Electro Refractories & Alloys Corp., Buffalo.



DEWEY C. HARVEY, chief plant engineer for Osborn Mfg. Co., Cleveland.



WILLIAM E. LYNN, general sales manager of Standard Cap & Seal Corp., New York.

plant, has been appointed secretary and controller for the Blatz Brewing Co., Milwaukee.

- **Harold Smith**, president of the T. L. Smith Co., Milwaukee, has been elected a vice-president of the Gyro clubs of Canada and the United States.

- **John F. Skillman** has been appointed acting deputy chief of the Materials Branch, WPB. Mr. Skillman will also continue in his capacity as Chief of the Ferrous Metals Section of the Materials Branch. He was former Detroit branch manager, Berger Div. Republic Steel Corp.

- **Charles Hummel** has been named comptroller of Bendix Aviation Corp., succeeding **W. H. Houghton**, who was recently elected treasurer. Mr. Hummel was formerly with Price, Waterhouse & Co.

- **Frank C. Mahnke, Jr.**, has been appointed advertising manager for All-Steel-Equip Co., Aurora, Ill.

- **J. W. Peckham** has been appointed manager of the development and design engineering department for the Bristol Co., Waterbury, Conn. Mr. Peckham joined the radio research department of the General Electric Co. in 1921. A year later he joined the Bristol radio engineering department. He was formerly Pacific Coast district manager, in charge of the company's San Francisco, Seattle, and Los Angeles offices and San Francisco branch factory.

- **William J. McMillen**, formerly assistant manager of roll sales at Mackintosh-Hemphill Co., Pittsburgh, has been appointed manager of production and manufacturing for the company. Mr. McMillen entered the employ of Mackintosh-Hemphill 26 years ago as an assistant in the physical testing laboratory.

- **Russell B. Gunia** has been appointed manager of the stainless steel bureau, metallurgical division, of Carnegie-Illinois Steel Corp. Mr. Gunia succeeds **Elmer Gammeter** who left the corporation to accept another position. Mr. Gunia's service with Carnegie-Illinois began in March, 1938, when he was employed as a junior metallurgist at the Gary Sheet and Tin Mills.

- **Marcello A. King** has joined the Worthington Pump & Machinery Corp., as executive engineer of its

Moore Steam Turbine Division, Wellsville, New York. He was formerly with the Elliott Co., where he held the position of manager of engineering.

- **E. Nuber** has been appointed manager of the Pacific Coast branch offices and factory of the Bristol Co., Waterbury, Conn. He was formerly associated with the Western Electric Co., as production engineer. Before being appointed to his new position as Pacific Coast district manager, Mr. Nuber was manager of the Akron branch office and factory of the Bristol Co.

- **G. V. Dutney** was appointed assistant manager of the industrial department of the Johns-Manville Sales Corp., N. Y. He joined Johns-Manville in 1920 and before that served in various sales and sales management positions in Pittsburgh, Cleveland, and New York.

- **C. A. Walker** has been appointed sales engineer in the Birmingham, Ala., territory for the Gould Storage Battery Corp., Depew, N. Y. Mr. Walker was formerly manager of the warehouse and service department in the Birmingham plant of Manhattan Rubber Mfg. Co., and sales representative in Tennessee and Kentucky for the Hood Rubber Co.

- **John J. Yezbak** has been made head of the news bureau of Timken Roller Bearing Co., Canton, Ohio. Mr. Yezbak succeeds **S. L. Huffman** who resigned from this position recently.

- **Victor H. Mantz** has been appointed assistant to the secretary and treasurer of the Allegheny Ludlum Steel Corp. Mr. Mantz, who will be located at Allegheny Ludlum's Brackenridge, Pa., offices, was formerly associated with the firm of Snyder, Ellinger, & Davis, accountants and auditors, Pittsburgh.

- **John W. Thompson**, for the past four years Cleveland district representative of the Carpenter Steel Co., has been appointed assistant manager of alloy steel sales. Mr. Thompson is now located in the company's general offices at Reading, Pa.

- **Roland E. Fulton** has been appointed director of the industrial relations department, Cook Electric Co., Chicago. Mr. Fulton has had broad experience in labor-management relations as the result of eight years in charge of personnel and labor rela-

tions work for the Chrysler Corp.'s Airtemp division at Dayton, Ohio.

- **Howard J. Eyman** has been appointed assistant to the chief metallurgical engineer, Carnegie-Illinois Steel Corp., succeeding **F. A. Wickerham**, who has been transferred to the office of the vice-president, research and technology. Mr. Eyman began his service with this U. S. Steel subsidiary in 1933 as quality observer at its Duquesne Works. In 1935 he was made a special investigator at the plant, and in 1940 became metallurgical inspector.

- **W. K. Page** has resigned as vice-president and general manager of Addressograph - Multigraph Corp., Cleveland, to become associated with the Wassell Organization of Westport, Conn.

- **Harold D. Kelsey** has been appointed assistant to the manager in charge of engineering at the Fort Wayne Works of General Electric Co. He succeeds the late **R. H. Chadwick**.

Mr. Kelsey entered the employ of the company in 1920. He was appointed engineer in charge of air conditioning and commercial refrigeration departments in 1939. He was formerly in charge of the engineering department of the Fort Wayne Works.

OBITUARY...

- **Frank Longstaff** one of the partners in the Longstaff & Meredith Automobile Radiator Co., Milwaukee, died July 6. Mr. Longstaff was 75 years of age.

- **Wilson F. Clemens**, associated with the Great Lakes Steel Corp., engineering division since 1929, died July 4 at Detroit.

- **Rufus Gardner Kellog**, one of the founders of the Louis Allis Co., Milwaukee, and sales manager of the Square D Co., Milwaukee, died recently at his home in Florida.

- **E. P. Jeffery**, vice-president in charge of manufacturing of American Blower Corp., Detroit, died July 8, at his home.

- **Edward F. Kenney**, metallurgical engineer on the staff of the vice-president of operations, Bethlehem Steel Co., died July 8. He began his career with the steel industry in 1907, when he became metallurgical engineer for the Cambria Steel Co., Johnstown, Pa. He was 74 years of age.

MACHINE TOOLS

... News and Market Activities

Tool Orders Slide 36%; Shipments Down

Cleveland

• • • The slide in machine tool orders that started with the turn of the year was accentuated sharply during June, when new orders were down more than 36 per cent from the May bookings. This condition was likewise reflected in the shipments, which slumped about 32 per cent from May's recorded deliveries of \$114,000,000.

The general falling off of new business and decline in shipments add to the already increasing gloom of the industry. Realizing that business could not hold up to anywhere near the level of 1942, leaders in the industry were very pessimistic in their predictions. However, events of the day bear out their greatest pessimism and seem to indicate that conditions will become worse than expected.

It was felt by some of the larger manufacturers that machine tool business would drop off to about 50 per cent of what it was at the close of last year, when shipments were valued at \$131,000,000 for December. However, the low point in the downward slide was not expected before the last quarter of 1943, and already shipments approach that 50 per cent level and are still on the downward trend. June deliveries, estimated between \$76,000,000 and \$78,000,000, are the lowest on record since 1941, when the boom of machine tool building began.

On the other side of the industry, machine tool dealers are likewise portraying the gloomy side of their natures. Sales have fallen off except for small one and two-unit orders on machine tools and for orders for accessories. The critical situation that existed on cutting tools, gages, and other products allied with machine tool production and tooling has disappeared, and many "off-the-shelf" sales are now possible that previously had three to six months' delivery delay.

One of the interesting developments of the week was the announcement by the Ohio Crankshaft Co. that, in laying a foundation for postwar service and sales of its TOCCO induction process heating and hardening equipment, five nationally known machine

tool dealers have been selected as TOCCO sales agents. It is believed that by directing sales through dealer channels the district offices of the organization will be in a position to serve more in a technical or engineering capacity than as a sales force.

The dealers who will handle the TOCCO sales program are: String,

Two Union Elections Result in CIO Winning One, Losing One

• • • Labor union activity in this district resulted in the CIO winning in one plant in this district and losing in another. During the past week elections were held at the Cincinnati Bickford Tool Co., where the CIO won the election as the bargaining agent for the employees, but in a vote at the Cincinnati Shaper Co., the independent union won the election by a substantial margin. Except for these

ON WAY TO BRAZIL: Before leaving for Brazil to consult with industrialists on relieving the machine tool shortage there and to inspect U. S. Navy bases, Charles A. Simmons, Sr., president of Simmons Machine Tool Corp. shakes hands with Capt. E. R. Henning of the Army-Navy Munitions Board, and Capt. Lyle F. Small, assistant head of the Shipbuilding Division.

British Combine Photos



Carlisle & Hammond Co., Cleveland, for the northern Ohio area; Syracuse Supply Co., Syracuse, N. Y., for New York state; William K. Stamets Co., Pittsburgh, for western Pennsylvania, West Virginia and parts of Ohio; E. A. Kinsey Co., Cincinnati, for southern Ohio, southern Indiana, Tennessee and Kentucky; and R. R. Stephens Co., St. Louis, for southern Illinois, Missouri, and Kansas.

instances, there was nothing else of outstanding interest in the market during the past week, machine tool builders indicating that a modest flow of new business continues to come in, but that they are definitely eating into backlogs with some plants expecting to be almost on a current shipment basis by the year's end. As a result of this situation, plans for production of other than machine tools are being pressed strongly, and virtually all the manufacturers in the area have some plans in progress. Several plants are already manufacturing other items and each week brings other producers of machine tools closer to the day when new products will be produced.

Berna Denies Rumor

• • • Tell Berna, general manager of the National Machine Tool Builders Association, emphatically denies the statement appearing in the Cleveland Press of July 23 that he may resign from the association.

Bonus System Planned

Sidney, Ohio

• • • Monarch Machine Tool Co. this week inaugurated an incentive wage system that will permit up to 30 per cent in bonuses to all employees of the company. The system will get under way immediately, with three departments, comprised of about 30 employees, starting to work on an incentive basis, and the remainder of the plant to go on the system as quickly as feasible.

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THIS BULLETIN GIVES *Valuable Information* ABOUT CRANES FOR YOUR PLANT

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- ◀ Takes R & M cranes apart and explains construction and mechanism
- ◀ Shows tables and diagrams on clearances and capacities of R & M cranes.

R & M CRANES SAVE TIME, LABOR AND MONEY... 3 to 6 Months Delivery

Wherever loads are to be lifted and moved—in plant or yard—R & M cranes can handle the job with greater speed and at lower costs. They have been doing it for the last 14 years in every industry in the United States. Their dependability and economy is assured.

Cranes in the R & M line range from $\frac{1}{2}$ ton to 25 tons in capacity with fast operating speeds for cranes up to 10 tons capacity and slower speeds for cranes of 10 to 25 tons capacity. Delivery, at the present time, 3 to 6 months.

Send for the valuable free R & M Crane Bulletin for detailed information about R & M Cranes and their uses. Or, if you prefer, ask us to have an R & M hoist and crane expert inspect your plant and make recommendations on the type you need.

CONSIDER POSTWAR REQUIREMENTS NOW

In many industries, conversion to peacetime production will necessitate changes in plant set-up and crane requirements. Also, cranes will be available to many not now eligible under priorities. We suggest that you plan your postwar crane installations now.

Take it Up
with
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NON-FERROUS METALS

... News and Market Activities

Army Releases Skilled Metal Miners

• • • At the direction of the Office of War Mobilization, 4500 skilled miners have been released by the Army to work in copper, zinc and molybdenum mines. In announcing this step to increase the mine production of copper, zinc and molybdenum, Robert B. Patterson, acting Secretary of War, said that efforts to recruit additional miners from civilian sources had failed to obtain the required numbers, and the success of the programs for 1943-1944 "is jeopardized by a growing shortage of these vital metals."

The soldiers will be released only for work in mines of highest productivity located in areas of critical labor shortages. Mines in which yield of metal per man is relatively small will not be permitted to hire the available men.

In charge of the program for releasing soldiers is the commanding general of the Ninth Service Command at Fort Douglas, Utah. The lection of the miners will begin in the Ninth Service Command and will be limited to units stationed west of Mississippi River.

The last survey made by the copper industry, however, shows a shortage of about 8000 workers in the mines and smelters. Since the number of soldiers released for work will be divided among the three metal mines, it is doubtful whether the mines will be sufficiently relieved of their manpower problems.

Mg Remelt Ingot Repriced

• • • Magnesium remelt ingot containing a combination of No. 4 and No. 17 alloys was removed from the Grade A ingot price list by OPA July 21. When maximum price regulation 302 was originally issued in January, it was expected that a direct use would be found for this alloy. However, subsequent experience has shown that this ingot can be used only for blending purposes. In the future, therefore, it is to be priced as a Grade B or Grade C ingot, according to its alloy content.

The maximum base price for Class A ingot is 21½c. per lb.; for Class B,

18½c. per lb.; and for Class C, 16c. per lb.

Correspondingly, OPA revoked the premiums of 1c. per lb. which sellers were permitted to charge for segregated scrap containing a combination of both No. 4 and No. 17 alloys.

The pricing changes are made in amendment No. 2 to maximum price regulation No. 302 (Magnesium Scrap and Remelt Magnesium Ingot), and become effective July 30, 1943. The foregoing No. 4 and No. 17 alloy numbers are designations for distinct grades of alloys established by the American Society for Testing Materials to serve as standards in industry practice. OPA maximum prices are based on A.S.T.M. grades.

Alcoa Gives Union Problem

• • • In an attempt to reduce absenteeism and labor turnover, the Aluminum Co. of America has placed the responsibility of correction to Local 755 of the United Mine, Mill & Smelters Workers Union, affiliated with the CIO. It will be the job of the union

to solve these two problems and to take such constructive steps as it can to bring about better labor relations and greater production in the Alcoa plants.

The union will have until Sept. 6 to prove what it can do. The program was drawn up by E. G. Cahill, personnel director of the company, together with union representatives and the Manpower Commission.

Union representatives will interview new workers to impress them with the importance of the job. They will also talk to employees who ask for statements of their availability in order to discourage transfers of workers and such statements will not be issued unless they have union approval. Truant workers will have to offer reasons for their absence in order to eliminate causes of absenteeism and if necessary to take necessary disciplinary action.

Incentive plans will also be studied during the test period and union officials and managements will draw up a morale building program.

At the end of the experiment the results will be studied for a future plan of action.

Aluminum Industry In Brazil Gets Power

New York

• • • The first generators and transformers for power stations which will generate 6000 kilowatts of power for Brazil's new aluminum industry are now being installed, according to officials of the International General Electric Co.

When, in 1940, the 1600-odd tons of aluminum which Brazil imported annually from the United States was cut off by the enormous demands of American aircraft industry, the Brazilian government laid plans to speed development of its 81 known deposits of bauxite estimated to contain approximately 150,000,000 tons. In Minas Geraes, a Brazilian concern, Electro Quimica Brasileira, made plans to enlarge its power facilities at three points—Saramenha, Caboclo and Funil—to serve a projected aluminum plant near Ouro Preto.

Plan to Conserve Cadmium

• • • The Conservation Division of WPB announced last week a further effort to conserve available supplies of cadmium for war purposes. Technical consultants will be made available at any time to advise industry in the use of substitutes. Requests for information and help from WPB consultants should be addressed to the Division of Information, Conservation and Salvage Unit, 1100 H Street NW, Washington.

Although in announcing these restrictions, WPB explained that the drive for the conservation of cadmium and the use of substitutes is made necessary by the fact that cadmium production has remained practically stationary for some time and prospects for increased quantities are not bright, it is believed by the trade that while the supply situation is not tight it is possible that WPB is planning some future uses for cadmium.

Refiner, Smelter Quotations

(Cents per lb.)

Copper, electrolytic, Conn. Valley.....	12.00
Copper, electrolytic, New York.....	11.75
Copper, Lake.....	12.00
Tin, Straits, New York.....	52.00
Zinc, East St. Louis.....	8.25
Zinc, New York.....	8.67
Lead, St. Louis.....	6.35
Lead, New York.....	6.50
Aluminum, virgin 99+%, delivered....	15.00
Nickel, electrolytic, base refinery.....	35.00
Magnesium, 99.9+%, carlots.....	21.50
Magnesium, 12-in. sticks, carlots.....	30.00
Cadmium, delivered.....	90.00

ALUMINUM, No. 12 foundry grade (No. 2), 13.50c. per lb.; steel deoxidizing grades, 12.50c. to 13.75c. per lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. Laredo, Tex., smelter. MERCURY, \$191 to \$193 per 76-lb. flask, f.o.b. shipping point or port of entry. BRASS INGOTS, commercial 55-5-5-5 (No. 115), 12.25c. a lb. COBALT, 97 to 99 per cent, \$2.11 per lb. BERYLLIUM COPPER, 3.75 to 4.25 per cent Be, \$15 per lb. contained Be. GOLD, U. S. Treasury, \$35 an oz. IRIIDIUM, 99.5 per cent, \$10 per troy oz. IRIIDIUM, \$165 per troy oz. PALLADIUM, \$24 per troy oz. PLATINUM, \$35 per oz. SILVER, open market, New York, 44.75c. per oz. ARSENIC, prime, white, 99 per cent, 4c. per lb.

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; red brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c., 95 per cent, 21.28c.; manganese bronze, 28.00c.; muntz metal, 22.75c.; naval brass, 24.50c.; phosphor bronze, grades A, B, 5 per cent, 36.25c.; Everdur, Herculoy, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.37c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c., 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculoy, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall; 2S, 40c. per lb. (1/2"H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, finish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb. base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity extras.

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in.

NON-FERROUS PRICES

thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

Variation from the above size, temper, finish and quantity require extras.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c. a lb.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus premiums for quantities and special preparation.)

OPA Group 1

No. 1 wire, No. 1 heavy copper..	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper..	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable..	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings..	10.50
Tinny (phosphor bronze) solids...	10.50
Copper-nickel solids and borings...	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)...	9.00
Gilding metal turnings	8.50
Unlined standard red car boxes ..	8.25
Lined standard red car boxes ..	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings ..	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3

Yellow brass soft sheet clippings..	8.625
Yellow rod brass turnings	3.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.25 ¹
	6.25 ²
Manganese bronze borings	6.50 ¹
	5.50 ²

OPA Group 4

Automobile radiators	7.00
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OPA Group 5

Refinery brass	5.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of 1/2c. a lb. For lots over 19,999 lb. add 1 1/2c. a lb. to prices listed.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cents per lb., f.o.b., shipping point.)

New zinc clippings, trimmings ..	7.25
Engravers', lithographers' plates..	7.25
Old zinc scrap	5.75
Unswaged zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under 1/2 per cent, 26c. per lb.; 90 to 98 per cent nickel, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 1/2
Electrolytic, full size	22 3/4c.
cut to size	30 1/2
Rolled, oval, straight, 15 in. and longer	23 1/2
Curved	24 1/2
Brass: Cast, 82-20, elliptical, 15 in. and longer	23 1/2
Zinc: Cast, 99.99, 16 in. and over	16 1/4
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz. lots..	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc sulphate, 89% crystals, bbls.	6.80

War Optimism Starts Premature Worry

• • • What appears to be premature worry over being caught with large holdings should the war end suddenly has been expressed from several sources and is reported to be the subject of an Institute meeting scheduled for Thursday in Cleveland. The anticipated capitulation of Italy and eminent successes of Allied invasion tactics are believed to have caused a wave of optimism over the length of the war which is creating exhilarated post-war thinking and some worry over financial stability by big scrap operators.

Edwin C. Barringer, president of the Institute of Scrap Iron & Steel, said in a Chicago Institute meeting last week that approximately 500,000 tons of battlefield scrap was expected to enter this country this year. He said that the bulk of such scrap would find its way into Eastern mills at OPA prices and that so far none was going into the Middle-West.

Speaking on post-war thinking, Mr. Barringer outlined a plan by which mills would take scrap on a contract basis from yards having definite commitments thus averting the chaos prevailing after the first World War. Mill inventories, he said, were somewhat improved but that a scrap shortage could be expected this Fall or Winter. Such shortage was not expected to be as acute as some seers anticipate.

Showing, possibly, the adverse effects of M-311 which restricts auto graveyard handling of scrap, the Scrap Processors Branch of the WPB Salvage Division reports a 41.2 per cent decline in the shipments of iron and steel and non-ferrous scrap to mills in June. May tonnage was 155,677, while June tonnage dropped to 91,548 as compared with 454,038 tons for June of last year.

Jalopy purchases, too, fell off to 65,350, a drop of 32.6 per cent, according to the report, as compared with an average for the last six months of 1942 of 157,000 junkers per month. The monthly average for the balance of this year is not expected to exceed 55,000, or about 330,000 for the period.

Describing the supply situation as "alarming," Paul C. Cabot, chief of the Salvage Division stated that increased steel requirements for the last half of the year had influenced the division to raise its salvage quota to 15,000,000 tons.

Meanwhile, rather poor collections are reported from most sections of the country which looks badly for such a high quota. Farming districts have been too concerned with crops and harvests to hunt out scrap and public apathy has reduced city and town collection far below previous levels. Manpower shortages have

Scrap Drive Goes Cosmopolitan

Boston

• • • It took air raid wardens, auxiliary police, Boy Scouts, fire department, other town workers, the Grange, Italian Club, Lions Club, Foremen's Club, Polish Club, Portuguese Club, State Guard and Unity Club representatives to dig up 9390 lb. of metal, 6400 lb. of tin cans, and poundages of paper, rags and old clothing in the Ludlow, Mass., drive. The whole works brought \$200.

also been a salient factor both in collections and preparation of scrap.

Not very great interest has been shown by many consuming mills so far in building up inventories. Birmingham reports that the general call for scrap expected as a result of the coal strikes has not materialized. The Pittsburgh hurry call of the last two weeks has subsided as diverted coal supplies ease the situation there. Other areas report at best choosy buying although high quality and heavy grades are acceptable and readily saleable in most areas. Cast scrap has had a steady call, shipyard and industrial grades have been flowing adequately.

ST. LOUIS—The scrap supply here continues light. Yards are unable to gather scrap due to a shortage of men and the flow of country scrap has been poor because farmers are busy with crops and harvest. Yard preparation, likewise, is faltering due to a shortage of manpower.

PHILADELPHIA—There has been no change in the scrap picture for the last two weeks. Mills seem to be content since there are no complaints about getting too much scrap or too little. All grades are being accepted.

NEW YORK—The scrap market this week continues at the snail's pace set several weeks ago.

PITTSBURGH—Scrap supply continues tighter. Mills are drawing on their stockpiles, particularly of open hearth grades, and deliveries from yards are slowing a bit. Dealers are complaining of lack of help to gather and segregate. Requirements that auto graveyards hold parts which may be usable rather than junk them is also reducing supply from such sources. Cast iron scrap is in demand. Some recent rejects on incoming shipments of alloy turnings, due to copper contamination, are further complicating supply problems.

CINCINNATI—District market is quiet and featureless. The demand for material is not aggressive and most users seem to be sanguine that present inventories will carry for some time.

BIRMINGHAM—The market here has reached such a dull state that brokers are finding it difficult to sell specialties. An expected increase in demand for steel grades occasioned by decrease in basic iron production from the recent coal strike has failed to materialize.

BOSTON—Other than shipyard, little heavy melting steel is coming out, and supply of No. 2 steel is far from heavy. However, there appears a surplus of engine blocks due to slack demand for them. Blocks are unpopular because yards don't have the help to clean them. Rejections by mills of turnings are still frequent because of alloy contents.

BUFFALO—Loaded with light scrap, Buffalo district mills this week reported to be taking only the "cream of the crop." Foundries were also reported feverishly hunting for cast scrap, virtually nonexistent in the area. Meanwhile, barges continued to bring heavy loads of mixed scrap from the Atlantic seaboard, and big yard operators were beginning to talk about obtaining some means of protecting them against losses should the war end suddenly and catch them with heavy holdings.

J & L And Weirton Get Ickes Special Coal

• • • For the second time Solid Fuels Administrator Harold L. Ickes invoked his wartime emergency coal distribution powers last week to provide coal to keep steel plants in full operation.

Orders were sent to 15 producers of the special purpose bituminous coals required by the steel industry diverting 58,500 tons of coal from other users to the Jones & Laughlin Steel Co. and to the Weirton Steel Co. The coal diverted comes from mines in West Virginia, Virginia and Kentucky.

SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

	BASIC OPEN HEARTH GRADES			BLAST FURNACE GRADES			Low Phos.		Heavy Structural and Plate			Foundry Steel				
	No. 1 & 2 Hvy. Melt. No. 1 Co. Bk. Shts. No. 1 & 2 Bundles	Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling	No. 2 Bushelling	Bar Crops, Punchings Plate Scrap	Billet, Bloom, and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank-shafts	Alloy Free Low and Turn. Phos. Sulphur	Heavy Axle and Forge First Cut Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$15.00	\$15.00	\$16.00	\$17.00	\$17.50	\$25.00	\$22.50	\$21.50	\$22.00	\$22.50	\$21.50	\$22.00	\$21.00	\$21.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point..	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25
Ashland, Ky.....	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00
Buffalo, N. Y.....	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75
Bethlehem, Pa.; Kokomo, Ind....	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75
Duluth, Minn.....	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50
Detroit, Mich.....	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35
Toledo, Ohio.....		12.85	12.85	13.85	14.85	15.35										
St. Louis, Mo.....	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles;																
Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50
Minnequa, Colo.....	18.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00
Seattle, Wash.....	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.50	15.00	12.50	14.00

*Baled turnings are \$5 per gross ton higher.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles. No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at \$14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrows Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above

for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced—\$2; 75 to 85% Fe—\$4; under 75% Fe—\$8 per ton. Mill scale of 65% or more Fe—\$8 per ton. Mill cinder and grindings, shipping point maximum price of \$4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

	Scrap Rails					
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown.....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington..	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco.....	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo.....	20.25	21.25	22.75	23.25	23.50	23.75
Detroit.....	18.85	19.85	21.35	21.85	22.10	22.35
Duluth.....	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.....	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.....	19.25	20.25	21.75	22.25	22.50	22.75
Seattle.....	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis.....	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	15.50	16.50	17.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging Box Size Cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B: switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

BASE PRICE SEGREGATED

	Solids, Lb. Cont. W	Turnings, Lb. Cont. W
Type 1.....	\$1.80	\$1.60
Type 2.....	1.60	1.40
Type 3.....	1.25	1.25
Type 4*.....	0.125	0.105
Type 5*.....	0.135	0.115

*Per lb. of scrap material.

BASE PRICE UNSEGREGATED SOLIDS

\$1.50 per lb. contained W if 5% or more.
\$1.15 per lb. contained W if over 1% and less than 5%.
\$0.80 per lb. contained Mo if 1½% or more.

BASE PRICE UNSEGREGATED TURNINGS

\$1.30 per lb. contained W if 5% or more.
\$1.00 per lb. contained W if 1% and less than 5%.
\$0.70 per lb. contained Mo if 1½% or more.

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Plates, wrought iron....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302)..	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grvd).....	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 121 to 131.

Pig Iron: (Per Gross Ton)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.89	\$25.89
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.68
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.39
Basic, Valley furnace....	23.50	23.50	23.50	23.50
Malleable, Chicago†....	24.00	24.00	24.00	24.00
Malleable, Valley.....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese.....	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Furnace coke, prompt...	\$6.50	\$6.50	\$6.50	\$6.00
Foundry coke, prompt...	7.50	7.375	6.875	6.87

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	July 27, 1943	July 20, 1943	June 29, 1943	July 28, 1942
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic.....	35.00	35.00	35.00	35.00
Magnesium, ingot.....	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Composite Prices . . .

FINISHED STEEL		PIG IRON		SCRAP STEEL	
July 27, 1943.....	2.25513c. a Lb.....	23.61 a Gross Ton.....	23.61	\$19.17 a Gross Ton.....	\$19.17
One week ago.....	2.25513c. a Lb.....	23.61 a Gross Ton.....	23.61	\$19.17 a Gross Ton.....	\$19.17
One month ago.....	2.25513c. a Lb.....	23.61 a Gross Ton.....	23.61	\$19.17 a Gross Ton.....	\$19.17
One year ago.....	2.26190c. a Lb.....	23.61 a Gross Ton.....	23.61	\$19.17 a Gross Ton.....	\$19.17
1943.....	HIGH 2.25513c., LOW 2.25513c.,	HIGH \$23.61, LOW \$23.61		HIGH \$19.17, LOW \$19.17	
1942.....	2.26190c., 2.26190c.,	23.61 23.61		19.17 19.17	
1941.....	2.43078c., 2.43078c.,	\$23.61, Mar. 20 23.45, Jan. 2		\$22.00, Jan. 7 \$19.17, Apr. 1	
1940.....	2.30467c., Jan. 2 2.24107c., Apr. 16	23.45, Dec. 23 22.61, Jan. 2		21.83, Dec. 30 16.04, Apr. 1	
1939.....	2.35367c., Jan. 3 2.26689c., May 16	22.61, Sept. 19 20.61, Sept. 12		22.50, Oct. 3 14.08, May 1	
1938.....	2.58414c., Jan. 4 2.27207c., Oct. 18	23.25, June 21 19.61, July 6		15.00, Nov. 22 11.00, June 1	
1937.....	2.58414c., Mar. 9 2.32263c., Jan. 4	23.25, Mar. 9 20.25, Feb. 16		21.92, Mar. 30 12.67, June 1	
1936.....	2.32263c., Dec. 28 2.05200c., Mar. 10	19.74, Nov. 24 18.73, Aug. 11		17.75, Dec. 21 12.67, June 1	
1935.....	2.07642c., Oct. 1 2.06492c., Jan. 8	18.84, Nov. 5 17.83, May 14		13.42, Dec. 10 10.33, Apr. 2	
1934.....	2.15367c., Apr. 24 1.95757c., Jan. 2	17.90, May 1 16.90, Jan. 27		13.00, Mar. 13 9.50, Sept. 2	
1933.....	1.95578c., Oct. 3 1.75836c., May 2	16.90, Dec. 5 13.56, Jan. 3		12.25, Aug. 8 6.75, Jan. 1	
1932.....	1.89196c., July 5 1.83901c., Mar. 1	14.81, Jan. 5 13.56, Dec. 6		8.50, Jan. 12 6.43, July 1	
1931.....	1.99626c., Jan. 13 1.86586c., Dec. 29	15.90, Jan. 6 14.79, Dec. 15		11.33, Jan. 6 8.50, Dec. 1	
1930.....	2.25488c., Jan. 7 1.97319c., Dec. 9	18.21, Jan. 7 15.90, Dec. 16		15.00, Feb. 18 11.25, Dec. 1	
1929.....	2.31773c., May 28 2.26498c., Oct. 29	18.71, May 14 18.21, Dec. 17		17.58, Jan. 29 14.08, Dec. 1	

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point ↓ Product													10 DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢
50 Electro tin plate, box	\$4.50	\$4.50	\$4.50												
75 Electro tin plate, box	\$4.65		\$4.65												
Black plate, 29 gage ⁵	3.05¢	3.05¢							3.15¢			4.05¢ ¹²			3.37¢
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢ ¹³	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
									(Coatesville and Claymont = 2.10¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.31¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE⁹															
Bright ¹⁰	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Galvanized															
	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

¹ Mill run sheets are 10c, per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also skaffing. For quantities of 20,000 to 29,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Boxed. ¹² Portland and Seattle price, San Francisco price is 2.50c. ¹³ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel Co. may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. **SEMFINISHED STEEL**—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. **ALLOY STEEL BARS**—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

PRICES

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	†† Hot Rolled, 2300	† Hot Rolled, 3100	†† Cold Drawn, 2300	† Cold Drawn, 3100
*Philadelphia	\$3.518	\$4.872 ⁵	\$5.018	\$3.922	\$4.772	\$3.605	\$3.666	\$3.822	\$4.072		\$7.116		
*New York	3.590	4.613 ²	5.010	3.974 ⁶	4.774	3.768	3.758	3.853	4.103	6.008	7.158	7.303	8.453
*Boston	3.774	4.744	5.224	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.312	7.344	8.494
*Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052				
*Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
*Washington	3.586	4.841	5.196	4.041	4.741	3.796	3.930	3.941	4.041				
*Chicago	3.25	4.20	5.23 ⁴	3.60	4.65 ⁸	3.55	3.55	3.50	3.75	5.75	6.90	6.85	8.00
*Milwaukee	3.387	4.337 ²	5.272 ⁴	3.737	4.787 ⁸	3.687	3.687	3.637	3.887	5.987	7.137	7.087	8.237
*Cleveland	3.35	4.40	4.977	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
*Buffalo	3.35	4.40	4.75 ⁴	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
*Detroit	3.45	4.50	5.00 ⁴	3.70	5.909 ⁸	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.309
*Cincinnati	3.425	4.475 ²	4.825 ¹	3.675	4.711	3.611	3.691	3.611	4.011				
*St. Louis	3.397	4.247 ²	5.172 ⁴	3.747	4.931 ⁸	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
*Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.25
*St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
*Omaha	3.865	5.443	5.608 ⁴	4.215		4.165	4.165	4.115	4.443				
*Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.23	7.18	8.33
*Birmingham	3.45 ³		4.75 ¹	3.70 ³		3.55 ³	3.55 ³	3.50 ³	4.43				
*Memphis	3.85	4.66	5.25	4.10		3.95	3.95	3.90	4.31				
*New Orleans	3.95	4.95	5.25	4.20		3.90	3.90	4.10	4.60				
*Houston	3.75	5.43	5.25	4.30		5.25	5.25	3.75	4.60				
† Los Angeles	4.95	7.15	5.95	4.90		4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
† San Francisco	4.55	7.55	6.60	4.50		4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
† Seattle	4.657	6.63	5.707	4.25		4.75	4.45	4.20	5.75		8.00		

NATIONAL EMERGENCY (N. E.) STEELS (Hot Rolled Mill Extras for Alloy Content)

Designa- tion	CHEMICAL COMPOSITION LIMITS, PER CENT							Basic Open-Hearth		Electric Furnace		
	Carbon	Man- ganese	Phos- phorus Max.	Sul- phur Max.	Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	\$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35			.10/ .20	.45	9.00	.95c	\$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35			.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	\$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9637	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over: Ex-ceptions: ¹ 500 to 1499 lb. ² 400 to 1499 lb. ³ 400 to 3999 lb. ⁴ 450 to 1499 lb. ⁵ 1000 to 1999 lb. ⁶ 0 to 1999 lb. ⁷ 300 to 10,000 lb. ⁸ 2000 to 39,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb.; galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

†† For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'd.

* Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

*Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basting points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; f.o.b. Duluth, billets only, \$2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	\$54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are \$2.00 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland ...	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57 1/2c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets 15.725c.	16.15c.	19.125c.	23.375c.	
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip 17.00c.	17.50c.	24.00c.	35.00c.	
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ROSS CARRIERS and LIFT TRUCKS

HANDLE LONG MATERIAL FASTER and at LESS COST!



THE speed with which materials can be fed to the production lines often determines the productive capacity of a plant. In scores of America's war plants ROSS 70-H Carriers and ROSS Industrial Lift Trucks are important links in the production set-up, bridging the gaps between warehouse and factory, and between departments.

- Here's why:**
1. Long, heavy, bulky materials handled faster in and out of storage.
 2. Storage facilities utilized to maximum capacity—materials can be stored to greater heights.
 3. Need for additional labor is minimized—costs are reduced—man-power can be released for other work.

FLEXIBLE, high-speed, cost-cutting ROSS Carriers and Lift Trucks will help your plant maintain the production necessary to meet today's urgent demands. Our experienced engineers and representatives are at your service, ready to help you solve your handling problems . . . Write today for Bulletin I-73.

THE ROSS CARRIER COMPANY, BENTON HARBOR, MICHIGAN



PAGE for WIRE



Today's production of **PAGE WIRE**, of course, is directed to the war effort and to essential industry—whether it be Stainless Steel Shaped Wire, Carbon Steel Shaped Wire, Welding Wire or such general items as Spring Wire, Bond Wire, Telephone Wire, etc.

As examples: (1) the springs used in a rifle that has attained a world-wide reputation for its performance in battle, are Page Stainless Steel Spring Wire; and (2) a special electrode developed by Page for welding armor—a contribution to the production of tanks.

★ ★ ★

Although completely occupied with the war effort, you will find our organization well able to work with you on plans you may have for the use of wire after the war.

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles,
New York, Pittsburgh, San Francisco, Portland



In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
½ in. & smaller x 6 in. & shorter...	65½
9/16 & ¾ in. x 6 in. & shorter...	63½
¾ to 1 in. x 6 in. & shorter...	61
1½ in. and larger, all length...	59
All diameters over 6 in. long...	59
Lag, all sizes	62
Flow bolts	65

Nuts, Cold Punched or Hot Pressed: (Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	64	64
¾ in. and smaller	62	62
¾ in. through 1 in.	60	60
9/16 to 1 in.	59	59
1½ in. through 1½ in.	57	58
1½ in. and larger	56	56

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ in. and larger)

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75

Small Rivets (7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) Per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

Standard wire nails	Base per Keg
Coated nails	\$2.55
Cutnails, carloads	2.55
	3.85

Annealed fence wire	Base per 100 Lb.
Annealed galvanized fence wire	\$3.05
	3.40

Woven wire fence*	Base Column
Fence posts (carloads)	67
Single loop bale ties	69
Galvanized barbed wire†	59
Twisted barbless wire	70
	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	61
¾ in.	66½	65
1 to 3 in.	68½	67½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

Upp and Adam

by Mason & Hahn

zero

means exactly nothing . . .

. . . if it be a Jap plane or the wrong TOOL STEEL welding rod

You can accomplish zero, without using the right welding material and correct engineering for tool and die welding. We are able to furnish both the proper electric arc or oxyacetylene tool steel welding wires plus specialized engineering direction. The Eureka tool steel welding wire line is the only answer. Eureka tool steel rods are obtainable for oil hardening, air hardening, water hardening, hot working tool steels or alloy purposes. They can be utilized by your own welders for maintenance repair of your present dies or for composite construction of new dies by applying proper tool steel welding rods as cutting edges on ordinary carbon steel (in most cases without subsequent heat treatment). Or you may send your broken high speed cutting tools to our plant for reclamation by the "SUTTONIZING" principle.

WELDING EQUIPMENT & SUPPLY COMPANY
230 LEIB ST., DETROIT, MICHIGAN

WE'RE UPP AND ADAM

Why not be Upp and Adam too—by letting us outline your tool and die reclamation program with Eureka Tool Steel Welding Electrodes; and the "SUTTONIZING" welding process for the reclamation of broken High Speed Steel Cutting Tools?

WELDING EQUIPMENT & SUPPLY COMPANY
221 Leib Street
Detroit, Michigan

Gentlemen: Please send me complete information on Eureka Electrodes and the "Suttonizing" welding process.

Name.....Title.....

Company.....

Address.....

City.....State.....

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	\$25.00	\$24.50	\$26.00	\$26.50	.....	.....
Brooklyn	27.50			28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	\$30.74	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	26.00	25.50	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	23.94	23.94	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	.....
St. Louis	24.50	24.50	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	35.46	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	22.42	.....
Hamilton, Ohio	24.00	23.50	24.50	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	22.42	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior Co.	.....	.....	.....	.....	.....	\$28.00
Lyles, Tenn. Co.	.....	.....	.....	.....	.....	33.00
St. Paul	26.76	.....	27.26	26.76	39.80	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	26.95	.....	.....	.....	.....	.....
San Francisco	26.95	.....	.....	.....	.....	.....
Seattle	26.95	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace\$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge \$30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer	4c.
Iron, hydrogen reduced, 300 mesh and finer	63c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh, 11½ to 12½c.	
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58½c.

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Cold	Hot
	Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04
2½ in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50
3½ in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54
(Extras for less carload quantities)		
40,000 lb. or ft. and over	Base	
30,000 lb. or ft. to 39,999 lb. or ft.	5%	
20,000 lb. or ft. to 29,999 lb. or ft.	10%	
10,000 lb. or ft. to 19,999 lb. or ft.	20%	
5,000 lb. or ft. to 9,999 lb. or ft.	30%	
2,000 lb. or ft. to 4,999 lb. or ft.	45%	
Under 2,000 lb. or ft.	65%	

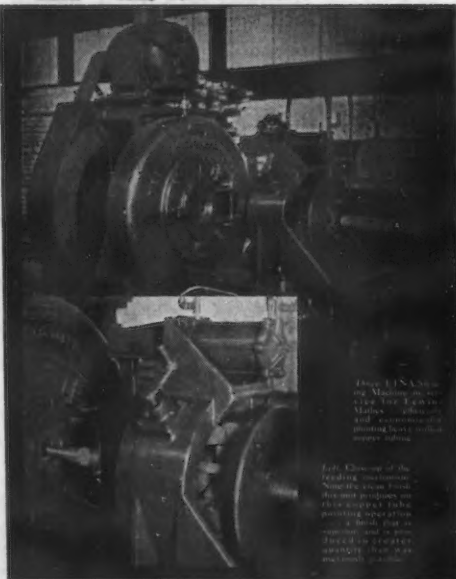
LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ¾" to 4" and the experience to help you get the most out of this type of machine.



One of the Etna Swaging Machines in operation. The machine is shown in operation, with a worker visible in the background.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING...

"Ask **ETNA** About Swaging"

ETNA

MACHINE COMPANY

TOLEDO

OHIO

PRICES

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago.....	\$54.80
6-in. and larger, del'd New York....	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles.....	69.40
6-in. and larger f.o.b. cars, Seattle.	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton

Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorous, 51.50	4.35

*Adjustments are made to indicated prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

COKE

Furnace

Per Net Ton

†Connellsville, prompt	\$6.50*
Foundry	
†Connellsville, prompt	\$7.50
Fayette County, W. Va. (Beehive) ..	\$8.10
By-product, Chicago	\$12.25
By-product, New England	\$13.75
By-product, Newark	\$12.40 to \$12.95
By-product, Philadelphia	\$12.38
By-product, Cleveland	\$12.30
By-product, Cincinnati	\$11.75
By-product, Birmingham	\$8.50†
By-product, St. Louis	\$12.02
By-product, Buffalo	\$12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.

*Hand-drawn ovens using trucked coal are permitted to charge \$7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	\$33.00
Domestic, f.o.b. Ohio River landing barges	33.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	33.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis	\$64.60
First quality, Pa., Md., Ky., Mo., Ill. ..	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill. ..	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern) ..	9.00

Chrome Brick

Per Net Ton

Standard, chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00
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Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

FOR DEFINITE DELIVERY

DATES ON TURNER GAUGES..

TURNER BULLETIN
DELIVERY DATES ANNOUNCED!

Precision TURNER BROTHERS Gauges

Announcing DELIVERY DATES on all TURNER GAUGES
* PLUG * FLUSH PIN * RING * BUILT UP * SNAP

FOUNDED BY FIVE BROTHERS
It was by agreement to give to those who use the Turner Gauge Grinding Company's gauges, the right to know the definite delivery dates on their gauges. This is the reason why the Turner Gauge Grinding Company is able to check their latest production schedules, so that they can give you up-to-the-minute delivery dates on their gauges, thereby assuring you of definite deliveries.

Representatives and Agents for the Turner Gauge Grinding Company are listed on the inside of this Bulletin.

SEND FOR
THIS BULLETIN
TODAY!

IT GIVES YOU UP-
TO-THE-MINUTE PRO-
DUCTION DATES ON:

PLUG
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RING
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SNAP
•
FLUSH PIN
•
BUILT UP
•

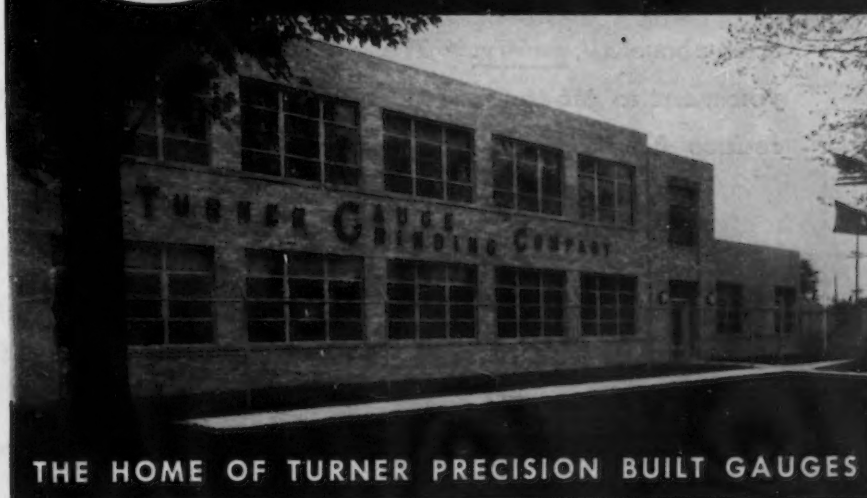
Because all trade journal advertisements have to be prepared 30 days before publication date, it is impossible for the Turner Gauge Grinding Company to publish accurate delivery dates in their advertisements. That is the reason why Turner asks you to write for the "Turner Bulletin" which is issued each month just after the publications are sent out. In this way, Turner is able to check their latest production schedules, so that they can give you up-to-the-minute delivery dates on their gauges, thereby assuring you of definite deliveries.



IMPORTANT

Let us put you on our mailing list so that you will be sure to receive this important bulletin each month. Send your name today!

TURNER GAUGE GRINDING COMPANY
2629 HILTON ROAD • • • • • FERDALE, MICH.



THE HOME OF TURNER PRECISION BUILT GAUGES



Good chain

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Pass this word to your men—BEFORE HOOK-
ING UP A CHAIN STRAIGHTEN IT OUT,
CLEAR IT FOR ACTION. • Many new men
don't know this should be done. • It's easy to
handle chain the right way. Right handling
results in better performance, longer life,
and, above all, safety. • Treat chain right if
you want to get the most work out of it, and
reduce breakdowns, delays and accidents.

AMERICAN CHAIN DIVISION

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles,
New York, Philadelphia, Pittsburgh, San Francisco

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT



FERROALLOY

Ferromanganese

78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn. Carload lots (bulk) \$135.00 Ton lots (packed) 141.00 Less ton lots (packed) 143.50 Premium, \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Electrolytic Manganese

99.9% manganese, maximum base contract price per lb. of metal, bulk, f.o.b. shipping point, with freight allowed to destination. Size, 1" x D.

	Eastern Zone	Central Zone	Western Zone
Carload lots	37.60c.	37.85c.	38.15c.
L.c.l. lots	39.60c.	38.60c.	40.65c.

Spiegeleisen

Maximum base contract prices, per gross ton, lump, f.o.b. Palmerton, Pa. 16-19% Mn 19-21% Mn 26-28% Mn 1% max. Si 1% max. Si 1% max. Si Carloads \$41.00 \$42.00 \$55.50 Less ton 47.50 48.50 62.00

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% silicon	6.65c.	7.10c.	7.25c.
75% silicon	8.05c.	8.20c.	8.75c.

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si) F.o.b. Jackson, Ohio \$29.50* Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquettes

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car Lots	3.35c	3.50c.	3.65c.

Spot prices ¼c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(Per gross ton, delivered, carloads, bulk) 3.00 carbon \$120.00* 2.50 carbon 125.00* 2.00 carbon 130.00* 1.00 carbon 140.00* Briquets, contract, basis carlots, bulk freight allowed, per lb. 5.80c.† Packed 6.05c.† Less-ton lots 6.55c.†

*Spot prices are \$5 per ton higher. †Spot prices ¼c. higher.

Ferrochrome

(65-72% Cr, 2% max. Si) OPA maximum base contract prices per lb. of contained Cr, lump size in carlots, f.o.b. shipping point, freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon	25.00c.	25.40c.	26.00c.
0.06% carbon	23.00c.	23.40c.	24.00c.
0.10% carbon	22.50c.	22.90c.	23.50c.
1.00% carbon	20.50c.	20.90c.	21.50c.
2.00% carbon	19.50c.	19.90c.	20.50c.

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

PRICES

Other Ferroalloys

Ferrotungsten, delivered, carlots, per lb. contained tungsten	\$1.90
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.60
Ferrovanadium, 35%-40%, contract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. contained vanadium	\$2.70
Special grade	\$2.80
Very special grade	\$2.90
Vanadium pentoxide, 88%-92% V ₂ O ₅ technical grade, contract basis, any quantity, per lb. contained V ₂ O ₅	\$1.10
Ferroboration, contract basis, 17.50% boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy	\$1.20
Ton lots	\$1.25
Silcaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Sorosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per pound contained boron	\$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium	\$2.25
Less-ton lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium	\$1.23
Less-ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less-ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore & St. Louis, per gross ton	\$142.50
3%-5% carbon	\$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala. carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	\$2.60
Under 100 lb.	\$3.00
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Less-ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton	\$102.50
Packed	\$107.50
Less-ton lots	\$112.50
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb.	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots, freight allowed, per lb.	10.50c.
Less-ton lots	11c.

Symbol OF INTEGRITY



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to War Production

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shot and grit for
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A shot or grit that will blast fast with
a clean finish.

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operators are daily changing to our
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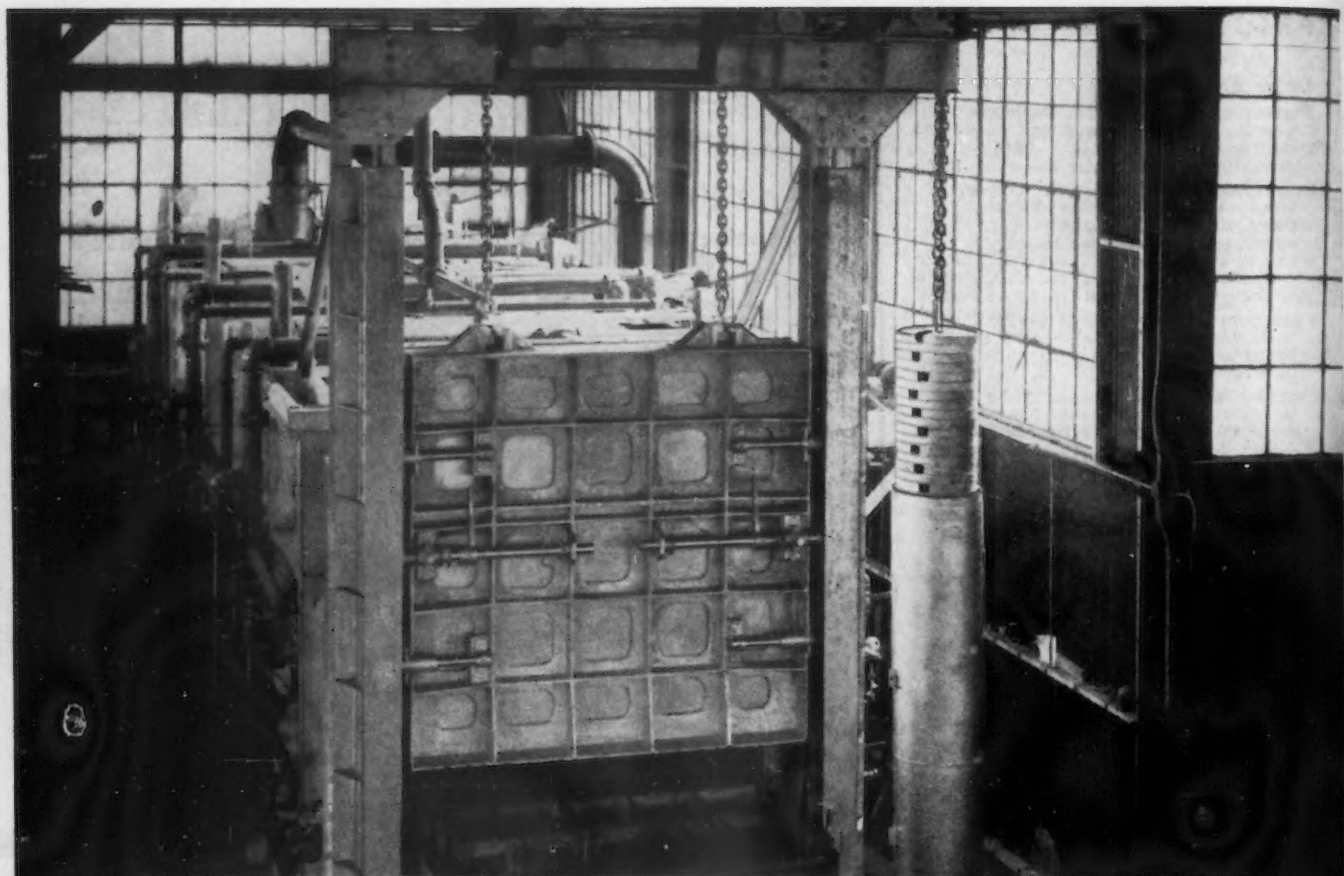
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WHEN you're forcing production out of an intermittent-type furnace day after day, month in and month out, dependable refractories are an absolute necessity. That's why Armstrong's Insulating Refractories are the right brick for the job.

Armstrong's Lightweight Brick are tough and strong. Their exceptional crushing and breaking strength (hot and cold) and high resistance to spalling enable them to stand the severe conditions of intermittent operation under peak loads. They give dependable performance for long periods of time and sharply reduce costly production interruptions for furnace repairs.

All five types of Armstrong's Insulating Brick (for temperatures from 1600° to 2600° F.) have high insulating efficiency which aids accurate temperature control. Their low heat storage makes them heat faster, cool faster. This steps up the cycle and saves fuel.

Twenty-eight years of experience with lightweight refractories enable Armstrong Engineers to help you select the right construction, brick, cement, and method of application for maximum efficiency. Write to Armstrong Cork Co., Insulating Refractories Department, 4907 Concord Street, Lancaster, Pa.



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